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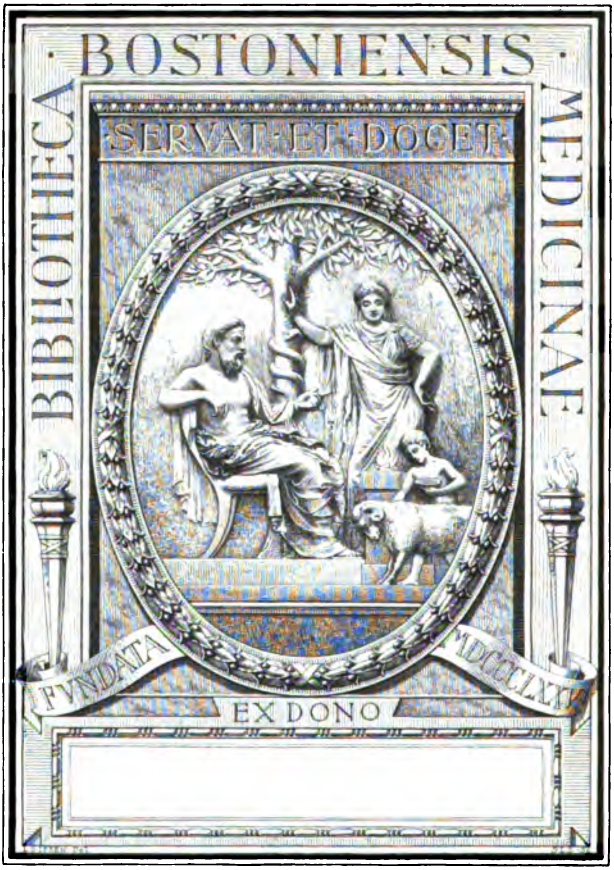
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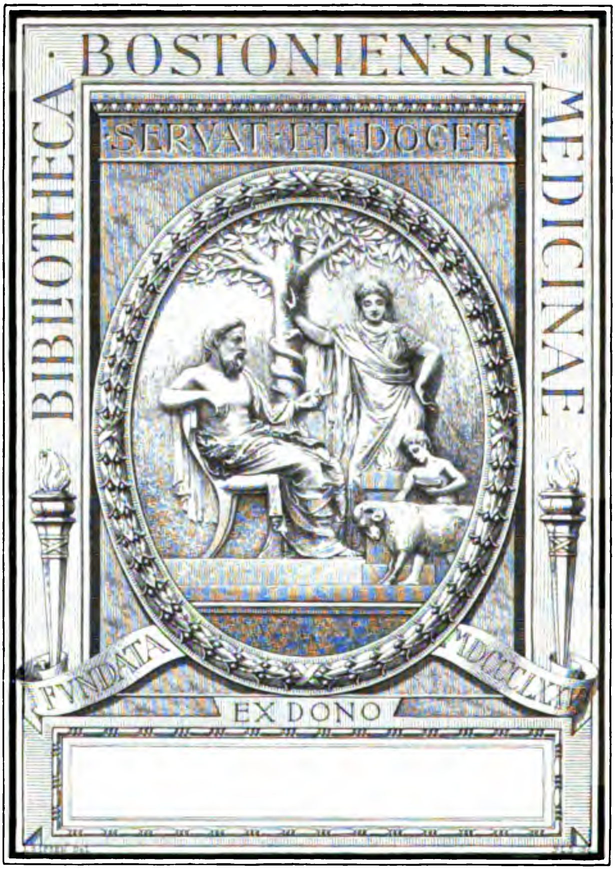
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Holmes, Edmund W., 2035 Chestnut
Holt, J. F., 1935 Poplar
Hopkinson, Oliver, 1606 S Broad
Horgan, Edward, 1833 Chestnut
Horwitz, Orville, 1721 Walnut
Hosmer, Charles M., 5134 Market
Houghton, C. W., 1528 N. 7th
Howard, E. C., 508 S. 10th
Hoyt, Daniel M., 3604 Chestnut
Hudson, Harry, 3228 N. 15th
Hughes, Donnel, 4003 Chestnut
Hughes, William E., 3945 Chestnut
Hulshizer, G. R., 225 Brown
Hume, John E., 900 S. 49th
Hungerbuehler, J. C., 1530 N. Franklin
Hurlock, F. I., 2153 N. 29th
Huston, David T., 320 S. 16th

I

Illman, G. Morton, 3031 N. Broad
Irwin, J. A., 2019 S. Broad
Irwin, William, 634 Synder Ave.

J

Jackson, Algernon B., 772 S. 15th
Jacob, Louis H., 135 W. Susquehanna Ave.
Jacobs, Francis B., 334 S. 19th
Janney, William S., 1535 N. Broad
Johnson, W. N., 6460 Germantown Ave
Jones, Charles J., 1009 N. 6th
Jones, Eleanor C., 1531 N. 15th
Jones, Thomas E., 145 Susquehanna Ave.
Jopson, John Howard, 334 S. 16th
Jordan, Henry D., 1829 Chestnut
Jump, Henry D., 4634 Chester Ave.
Jurist, Louis, 916 N. Broad

K

Kalteyer, Frederick K., 214 S. 15th
Kamerly, E. F., 1130 Spruce
Kane, J. A. Bayard, 256 S. 15th
Karpeles, M. J., 38 W. Chelten Ave., Germantown
Kassabian, Mihran K., 1831 Chestnut
Katzenstein, G. P., 1704 N. 18th
Kearns, William, 2615 E. Lehigh Ave.
Keech, Harry B., 636 E. AlleghenyAve.
Keeler, Joseph C., 4059 Spruce
Keely, Robert N., 1831 Chestnut
Keen, William W., 1729 Chestnut
Keiser, E. E., 3710 Longshore, Tacony
Kellar, A. P., 136 Race
Kelly, A. O. J., 1911 Pine
Kelly, Francis J., 745 S. Broad
Kelly, J. V., 4257 Main, Manayunk
Kelsey, Ernest W., 1217 Spruce
Kemp, John H., 2134 S. 15th
Kempton, A. F., 2118 Pine
Kercher, Delno E., 1927 S. 18th
Kerkhoff, Martha E., 134 N. 20th
Kevin, R. O., 1315 S. 15th
Kilduffe, Robert, 5613 Wyalusing Ave.
King, William H., 412 S. 15th
Kirby, E. R., 1202 Spruce
Kirkbride, M. F., 2212 Green
Kirschbaum, Helen, 707 Spruce
Kirkpatrick, A. B., 1745 N. 15th
Klapp, W. P., 1716 Spruce

Klein, Alexander, 721 Spruce
Klemm, Adam, 504 N. 4th
Kline, W. O., Jr., 1211 Germantown Ave.
Klopp, Peter P., 618 Lehigh Ave.
Kneass, S. S., 19th and Sansom
Knight, T. Howard, 4109 Walnut
Knipe, Jay C., 15th and Diamond
Knorr, John K., Jr., 1630 York
Knowles, Frank C., 332 S. 17th
Knowles, George A., 4812 Baltimore Ave.
Kohn, Bernard, 1325 N. 13th
Kollock, Catharine, 1926 Spring Garden
Kottner, Charles H., 1500 N. 7th
Krauss, Frederick, 930 Franklin
Kremer, Walter H., 6122 Germantown Ave.
Krug, John A., 2437 N. 5th
Krusen, Wilmer, 127 N. 20th
Kyle, D. B., 1517 Walnut
Kyle, E. Bryan, 2821 Frankford Ave.
Kynett, H. H., 614 S. 48th

L

Ladd, Horace, 1524 Arch
Laird, J. Packard, Devon, Pa.
Lammer, Francis J., 2266 N. 19th
Lamparter, E., Green Lane, Montgomery Co., Pa.
Lampen, Louis P., 618 N. 40th
Lancaster, Thomas, 1303 N. Broad
Landis, H. R. M., 2125 Walnut
Lane, D. W., 2237 N. 29th
Langrehr, H., 2226 N. Broad
Laplace, Ernest, 1828 S. Rittenhouse Square
Large, O. P., 29th and Susquehanna Ave.
Laroque, G. Paul, 256 S. 15th
Latta, S. W., 3626 Baring
Lautenbach, L. J., 1723 Walnut
Leach, W. W., care of Eastern Penitentiary, 21st and Fairmount Ave.
Leaman, A. H., 832 N. Broad
Leaman, Rosh, 1818 Girard Ave.
Leamy L. J., 33d and Spring Garden
Le Boutillier, Theodore, 2040 Chestnut
Leconte, R. G., 1530 Locust
Lee, Benjamin, 241 W. Seymour, Germantown
Lee, Walter Estell, Pennsylvania Hospital, 8th and Spruce
Le Fever, Charles W., 1708 Pine
Leffmann, Henry, 119 S. 4th
Leidy, C. Fontain M., 318 S. 15th
Leidy, Joseph, 1319 Locust
Leof, M. V., 495 N. 4th
Leonard, C. L., 112 S. 20th
Leopold, Isaac, 1518 Franklin
Levan, George F., 629 N. 40th
Levi, I. Valentine, 1733 N. 16th
Lewis, Bertha, Malvern, Pa.
Lewis M. J., 1316 Locust
Liggett, Samuel J., 936 W. Somerset
Lincoln, Clarence W., Ridley Park, Pa.
Litch, Wilbur F., 1500 Locust
Lloyd, J. H., 3918 Walnut
Lockrey, Sarah H., 1520 Vine
Loder, P. E., 517 S. 8th
Loeb, Ludwig, 1421 N. 15th
Loeb, Victor A., 1901 N. 8th
Longaker, Daniel, 1402 N. 16th
Longcope, Warfield T., Pennsylvania Hospital, 8th and Spruce
Longenecker, C. B., 3512 Hamilton
Longenecker, Jerome, 3409 Spring Garden
Longstreth, Morris, 1416 Spruce
Lopez, J. H., 126 N. 17th
Lott, William C., 4001 Walnut
Loughridge, Samuel S., 512 Lehigh Ave
Loux, H. R., 1941 N. 12th
Love, Louis F., 1305 Locust
Lowenburg, Harry, 2321 N. 16th
Luther, John W., 412 S. 15th
Lytle, I. Walter, 1530 N. 20th

Mc

McAlarney, W. M., 1426 Poplar
McCamy, R. H., 1932 E. Cumberland
McCarthy, D. J., 1329 Spruce
McClary, Samuel, 3d, 348 S. 15th
McClellan, George, 1352 Spruce
McClure, Sorden, 21 S. 16th
McCollin, S. M., 1823 Arch
McCombs, Robert S., 2113 Chestnut
McConaghy, Albert, Perry Building, 16th and Chestnut
McConnell, Guthrie, 1618 Pine
McConnell, J. W., 638 N. 40th
McCreight, Charles, 2620 N. 5th
McCreight, Robert, 1340 E. Montgomery Ave.
McDaniel, Earl L., 1325 Erie Ave.
McDougald, John Q., 1336 Lombard
McDowell, N. S., 1810 N. 16th
McDowell, S. B., 925 N. Broad
McFarland, Joseph, 442 W. Stafford, Germantown
McFarlane, Catharine, 6112 Germantown Ave.
McGuigan, John I., 6018 Drexel Road
McKeage, William, 3131 N. Broad
McKee, James H., 1519 Poplar

McKenna, John A., Lansdowne, Pa.
McKinley, A. L., 3702 N. Broad
McLean, John D., 1519 Christian
McLoughlin, John J., 1532 S. 5th
McReynold, Robert P., 3722 Walnut
MacCoy, Alexander W., 216 S. 15th
MacFarland, Frank H., 1316 S. 5th
MacIntosh James W., 1144 Jackson

M

Maier, Oscar H., 2242 N. Broad
Makuen, G. Hudson, 252 S. 16th
Manasses, Jacob L., 2501 N. 32d
Mann, James P., 1234 Spring Garden
Marcellus, Marius B., 478 Green Lane
Marshall, Clara, 258 S. 16th
Marshall, George M., 1819 Spruce
Martin, Collier Ford, 1831 Chestnut, Room 601
Martin, Edward, 1506 Locust
Martin, Joseph, 2009 Columbia Ave.
Masland, H. C., 2134 N. 19th
Massey, G. B., 1831 Chestnut
Mathews, F., 1720 N. 22d
Mayo, Florence, 414 W. Huntingdon
Mays, T. J., 1829 Spruce
Mecaskey, John W., 2306 E. York
Megargee, George L., 1810 S. Broad
Meigs, A. V., 1322 Walnut
Mellersh, Alfred H., Lyceum and Manayunk Aves.
Metheny, D. G., 2131 Spruce
Metheny, S. A. Sterrett, 617 N. 43d
Metzler, Gottfried, 949 Franklin
Miller, D. J. M., 1801 Pine
Miller, M. B., 414 S. 15th
Miller, Mary T., 313 N. 33d
Miller, R. G. B., 634 Diamond
Milliken, F. H., 3614 Walnut
Mills, Charles K., 1909 Chestnut
Mills, H. Brooker, 2263 N. 21st
Mitchell, John K., 1730 Spruce
Mitchell, S. W., 1524 Walnut
Mitcheson, Robert S. J., 1522 N. 15th
Modell, Daniel A., 514 N. 4th
Mohlman, Rudolph C., 1921 Chestnut
Mongel, Ernest B., 883 Belmont Ave.
Montgomery, E. E., 1703 Walnut
Moore, C. C., 2118 N. Hancock
Moore, Ed. J., 1902 N. 22d
Moore, Edward J., 1902 N. 23d
Moore, H. D., 1528 Tasker
Moore, John D., 1505 N. 19th
Moorhead, W. W., 1523 Pine
Morehouse, George R., 2033 Walnut
Morgan, A. C., 2114 N. 31st
Morris, Caspar, 2050 Locust
Morris, E. J., 128 S. 18th
Morris, Henry, 313 S. 16th
Morris, J. C., 1514 Spruce
Morrison, W. H., Holmesburg.
Morton, G. D., 2048 Locust
Morton, Samuel W., 1933 Chestnut
Morton, Thomas S. K., School Lane west of Wissahickon Ave.
Moss, William, Main and Chestnut Ave Chestnut Hill
Mossell, N. F., 1432 Lombard
Moulton, A. R., Pennsylvania Hospital, Department for the Insane, 49th and Market
Moylan, J. J., 228 E. Price, Germantown
Moylan, P. F., 1005 N. 6th
Mudgett, John H., 1601 N. 15th
Muller, Andrew J., 1136 N. 3d
Muller, George P., 1626 Spruce
Muller, R. E., 2031 S. Broad
Mulrenan, John P., 1435 S. 15th
Musser, J. H., 1927 Chestnut
Musson, Emma E., 213 S. 17th
Mutchler, L. H., 2030 Tioga
Myers, T. D., 1521 Spruce

N

Nash, Joseph D., 1316 N. 11th
Nassau, Charles F., 1720 Chestnut
Neff, Joseph F., 2300 Locust
Neilson, Thomas R., 122 S. 17th
Neuber, S. T., 1855 Frankford Ave.
Newbold, H. A., 3907 Walnut
Newcomet, W. S., 3501 Baring
Newlin, Arthur, 1702 Pine
Newmayer, Sol. W., 638 Spruce
Newton, Roblev D., 6137 Vine
Nicholson, William R., 1427 Walnut
Nightingale, H. B., 247 N. 6th
Noble, C. P., 1509 Locust
Noble, William H., 2101 N. 13th
Nock, Thomas O., 821 N. 24th
Norris, George W., 1530 Locust
Norris, Richard C., 500 N. 20th

O

Off, Henry J., 323 S. 20th
O'Farrell, G. D., Jr., 2317 E. Cumberland
O'Hara, M., 227 S. 20th
O'Hara, M., Jr., 42 S. 19th
Oliver, C. A., 1507 Locust
O'Malley, J. M., 2217 S. Broad
O'Neill, Michael P., 1502 S. 10th
O'Reilly, Charles A., 1240 Erie Ave.
Ostheimer, Maurice, 225 S. 20th
Ott, Lambert, 1531 N. 17th
Ottinger, Samuel J., 12th and Master
Owen, J. J., 411 Pine

P

Packard, F. R., 1831 Chestnut
Packard, John H., 517 Chestnut
Page, Henry F., 1907 Girard Ave.
Paist, Henry C., 536 N. 7th
Pancoast, Henry K., 3205 Baring
Pancoast, J. William, 1611 N. 13th
Parish, Benjamin D., 2109 Chestnut
Parke, William E., 1739 N. 17th
Parker, J. Sparks, 7119 Woodland Ave.
Patterson, F. W., 1503 Locust
Patterson, Howard, Germantown and Lehigh Aves.
Paul, F. M., 553 Mt. Prospect Ave., Newark, N. J.
Pearson, J. S., 1507 Christian
Peck, Elizabeth L., 819 N. 40th
Peltz, Josiah, 608 N. 17th
Pennebaker, Benjamin, 4862 Tacony
Pennock, W. J., 1422 N. 17th
Penrose, C. B., 1720 Spruce
Pepper, Wilbur L., 3148 Berks
Pepper, William, 1811 Spruce
Perkins, F. M., 1428 Pine
Peter, L. C., 2136 Oxford
Pfahler, G. E., 1409 Spruce
Pfromm, George W., 1434 N. 15th
Philips, J. L., 2213 Tioga
Phillips, Horace, Pennsylvania Hospital, Department for the Insane, 49th and Market
Phillips, James R., 1515 S. 6th
Phillips, R. J., 123 S. 39th
Picard, Henry L., 1721 N. 25th
Pickett, William, 1508 N. 4th
Piersol, G. A., 4724 Chester Ave.
Pilkington, Horatio, 4238 Paul, Frankford
Pitfield, R. L., 5211 Wayne Ave.
Plass, Charles F. W., Cor. Chew and Chelten Ave., Germantown
Pontius, Paul J., 1829 Chestnut
Porter, William G., 1118 Spruce
Posey, William Campbell, 1835 Chestnut
Potsdamer, Joseph B., 1333 Franklin
Pottburg, Charles, 2338 N. Broad
Potts, Barton H., 109 S. 20th
Potts, Charles S., 1733 Chestnut
Prendergast,M. F., 2435 Columbia Ave.
Price, George E., 1810 Tioga
Price, Joseph, 241 N. 18th
Purnell, Caroline M., 132 S. 18th
Pyle, W. L., 1806 Chestnut

R

Radcliff, McCluney, 711 N. 16th
Rainear, A. R., 2024 Diamond
Ramsay, Alexander, 103 E. LehighAve.
Ramsay, Robert N., 1124 S. 46th
Randall, B. Alexander, 1717 Locust
Randenbush, James S., 3633 N. 15th
Ransley, A. W., 1315 S. Broad
Ravenel, Mazyck P., Veterinary Department, University of Pennsylvania, 39th and Woodland Ave.
Reber, Wendell, 1212 Spruce
Reckefuss, Charles H., Jr., 506 N. 6th
Reed, Boardman, 1831 Chestnut
Regar, H. K., 1909 N. 13th
Rehfuss, E. G., 1316 S. Broad
Rehm, Victor G. R. J., 1234 W. Somerset
Remington, Arthur H., 1701 De Lancey
Reynolds, Anna M., 1534 Dauphin
Reynolds, J. P., 705 Spruce
Rhein, J. H. W., 1732 Pine
Rhein, Robert D., 2016 Pine
Rhoads, E. J., 159 W. Coulter, Germantown
Rhoads, J. N., 1635 S. Broad
Richards, Florence H., 1802 Catharine
Riesman, David, 1624 Spruce
Righter, H. M., 1443 S. 2d
Ring, G. O., 1442 N. 13th
Risley, Samuel D., 1824 Chestnut
Roberts, John B., 313 S. 17th
Roberts, Joseph V. C., 104 S. 42d
Roberts, Walter, 33 S. 19th
Robertson, J. F., 2465 N. 31st
Robertson, William E., 912 N. 4th
Robinson, Edwin T., 1326 Pine
Robinson, George, Jr., 2215 N. 16th
Robinson, William D., 2012 Mt. Vernon
Robrecht, John J., 3906 Chestnut
Rocap, William A., Olney, Phila.
Roderer, John F., 2426 N. 6th
Rodman, William L., 1904 Chestnut
Roe, W. J., 1210 Locust
Roller, Benjamin F., 5202 Haverford Ave
Rosenberger, Randle C., 2330 N. 13th
Rosenthal Edwin, 517 Pine
Ross. George G., 1721 Spruce
Ross, Joseph H., 106 Susquehanna Ave.
Rottner Charles R., 1500 N. 7th
Roussel, A. E., 2112 Pine
Rovno, Philip, 423 Pine
Royce, Charles C., 6504 Germantown Ave.
Royer, B. Franklin, Municipal Hospital, 22d and Lehigh Ave.
Ruffell, Charles E., 244 E. Girard Ave.
Rugh, J. T., 1616 Spruce
Runkle, Stuart C., 1605 Christian
Ruoff, William, 1301 N. 13th

S

Sailer, Joseph, 248 S. 21st
Sajous, Charles E., 2043 Walnut
Salade, L. A., 4000 Spruce
Salinger, Julius L., 1729 N. 42d
Santee, E. J., 532 N. 6th
Sargent, A. Alonzo, 939 Spruce
Sartain, Paul J., 212 W. Logan Square
Saxman, N. H., 2739 Kensington Ave.
Saylor, Edwin S., 1602 N. 16th
Schamberg, Jay F., 1636 Walnut
Schamberg, Morris I., 1636 Walnut
Schell, J. Thompson, 2505 N. 17th
Schneideman, T B., 1831 Chestnut
Schoales, Charles B., 1428 N. 11th
Scholler, G. W., 2715 N. 12th
Schumann, Edward A., 15 Pelham Road, Germantown
Schweinitz, G. E. de, 1705 Walnut
Schwenk, P. N. K., 810 N. 7th
Schwerin, Justin G., 1625 Diamond
Scott, J. Alison, 1834 Pine
Scull, William B., 3024 Richmond
Seabrook, Alice M., 22d and N. College Ave.
Seiss, Ralph W., 255 S. 17th
Seltzer, C. M., 2001 Green
Service, Charles A., City Line and Belmont Ave., Bala
Sharp, Leedom, 1309 Pine
Shea, William K., 1705 N. 18th
Shellenberger, J. R., 5505 Main, Germantown
Shelmerdine, E. Kirkland, 6135 Germantown Ave.
Shober, J. B., 1731 Pine
Shoemaker, George E., 1831 Chestnut
Shoemaker, J. V., 1519 Walnut
Shoemaker, William T., 2031 Chestnut
Shumway, Ed. A., 2007 Chestnut
Shute, Harry A., 2145 Howard
Simcox, Lawrence, 5201 Ridge Ave.
Simsohn, Joseph S., 909 Franklin
Sinclair, John F., 216 S. 41st
Sinexon, Justus, 114 S. 18th
Singer, Benjamin L., 1914 N. 18th
Sinkler, Wharton, 1606 Walnut
Siter, E. H., 2038 Locust
Skidelsky, R. S., 824 N. 24th
Skillern, P. J., 241 S. 13th
Skillern, Ross H., S. E. Cor. 34th and Race
Skillern, S. R., 3509 Baring
Skilling, M. K., 1635 Christian
Slaughter, Charles H., 1332 S. 10th
Slocum, H. A., 1900 Chestnut
Small, John Hamilton, The Tracy, 36th above Chestnut
Small, William B., 2232 Green
Smith, A. D., 6019 Germantown Ave.
Smith, Caroline E., Perry Building, 16th and Chestnut
Smith, David D., 5214 Wayne Ave., Germantown
Smith, John G., 4515 Baker
Smith, Joseph R., 2300 De Lancey
Smith, S. Maccuen, 1700 Walnut
Smock, L. P., 3330 Chestnut
Snively, I. N., 1617 N. Broad
Snively, R. D., 1707 Tioga
Somers, Lewis S., 3554 N. Broad
Spangler, Ralph H., 322 S. 11th
Spellissy, Joseph M., 110 S. 18th
Spencer, George W., 1838 Christian
Spiegle, Grace E., 2115 N. 12th
Spiller, William G., 4409 Pine
Sprissler, Theodore, 1151 S. Broad
Stahl, B. Franklin, 1727 Pine
Staller, Max, 631 Catherine
Stanton, William B., 732 Pine
Starkey, Frank R., 445 S. 44th
Steele, J. Dutton, 40th and Locust
Steel, William A., 3300 N. Broad
Steinbach, L. W., 1309 N. Broad
Stelwagon, H. W., 223 S. 17th
Stengel, Alfred, 1811 Spruce
Stern, Max J., 711 N. Franklin
Stetson, John B., 1504 Arch
Stevens, A. A., 314 S. 16th
Stewart, A. H., 252 N. 12th
Stewart, D. D., 1429 Walnut
Stewart, Francis T., 311 S. 12th
Stewart. John, 2334 N. 29th
Stillings, L. C., Lenni Mills, Delaware Co., Pa.
Stone, E. R., 1701 Master
Stone, James F., 1806 Green
Stout, E. J., 1534 Master
Stout, George C., 1611 Walnut
Stout, Oliver, 3356 N. 5th
Stover, I. Francis, 33 Carpenter, Germantown
Strawbridge, George, 202 S. 15th
Strawn, Joseph, 1700 Wallace
Strecker, H. A., 327 S. 12th
Strittmatter, I. P., 999 N. 6th
Strobel, John, 948 N. 5th
Strouse, Fred. M., 2220 N. Broad
Stryker, Samuel S., N. E. Cor. 39th and Walnut
Sutliff, Van Duyne A., 759 E. Allegheny Ave.
Sutton, Howard A., 112 S. 18th
Swan, John M., 3713 Walnut
Sweet William M., 1205 Spruce

T

Taggart, Thomas D., 1825 Fairmount Ave.
Tait, Thomas W., 318 S. 11th
Talley, F. W., 1346 Spruce
Talley, James E., 5602 LansdowneAve.
Tappan, Lucy N., 123 S. 16th
Target, John D., 1112 Jackson
Taylor, Charles F., 1520 Chestnut
Taylor, James Gurney, 6041 Drexel Road, Overbrook
Taylor, John J., 4105 Walnut
Taylor, J. M., 1504 Pine
Taylor, William J., 1825 Pine
Taylor, William L., 1340 N. 12th
Teller, William H., 1934 Green
Thomas, C. H., 3634 Chestnut
Thomas, F. W., 27 Mt. Airy Ave., Germantown
Thomas, George P., 2113 N. 7th
Thomas, T. Turner, 1636 Francis
Thomas, W. Hersey, 1445 N. 17th
Thomson, A. G., 1426 Walnut
Thomson, William, 1426 Walnut
Thorington, James, 120 S. 18th
Thornton, E. Q., 922 Spruce
Thrush, M. Clayton, 3705 Spring Garden
Town, Edwin C., Broad Street Station, 15th and Market
Tracy, Stephen E., 1415 Walnut
Tucker, Henry, 119 S. 20th
Tull, M. G., 4629 Baltimore Ave.
Tulley, Edgar W., 2400 N. Broad
Tunis, Joseph P., 1426 Pine
Turnbull, Charles S., 1935 Chestnut
Turner, John B., 1525 Christian
Tyson, James, 1506 Spruce
Tyson, T. M., 1506 Spruce

U

Uhle, Alexander A., 1327 Jefferson
Ullom, Josephus T., 24 Carpenter, Germantown
Ulman, Joseph F., 2602 N. 29th
Umsted, W. M., 1624 N. 25th

V

Vanderslice, Ed. S., 127 S. 5th
Van Dervoort, C. A., 3306 N. Broad
Van Gasken, Frances C., 115 S. 22d
Van Harlingen, Arthur, 1831 Chestnut
Van Pelt, William T., 1528 Spruce
Vansant, E. L., 1929 Chestnut
Veasey, C. A., 116 S. 19th

W

Wadsworth, William S., 37th above Chestnut, The Covington
Walk, James W., 737 Corinthian Ave.
Walker, Gertrude A., 308 S. 13th
Walker, James B., 1617 Green
Wallis, J. Edw., 2642 Richmond
Wallis, J. Frank, 245 Pine
Walsh, Edward Francis, 111 E. Lehigh Ave.
Walsh, Joseph, 732 Pine
Wamsley, James W., 9223 Spruce
Wanamaker, John, 1511 Mt. Vernon
Ward, E. Tillson, 1415 S. Broad
Ward, Nathan G., 1807 Chestnut
Warder, Charles B., 1715 Walnut
Warder, William H., 1212 N. Broad
Warmuth, Mitchell P., 863 N. 20th
Watson, A. W., 126 S. 18th
Watson, Edw. W., 131 N. 20th
Watson, W. N., 4110 Parkside Ave.
Watt, Robert, 2822 Frankford Ave.
Weaver, W. W., 6105 Woodland Ave.
Weber, Charles H., 1304 Pine
Weber, Harry F., 4440 Germantown Ave.
Weintraub, Sarah L., 1513 S. 9th
Weisenburg, T. H., 2030 Chestnut
Welch, William M., 1411 Jefferson
Wells, P. Fraley, 40th and Brown
Wells, William H., 333 Pine
Wentz, B. W., 6602 Woodland Ave.
Werner, Ellis Bruce, 3805 Baring
West, John W., 1125 Wallace
West, S. Leslie, 1530 Diamond
Westcott, T. S., 1833 Spruce
Wetherill, Henry E., 3734 Walnut
Weyant, Harry W., 905 N. 4th
Wharton. H. R., 1725 Spruce
Wheeler, E. B., 1918 N. 8th
White, C. Y., 324 S. 16th
White, Francis, 1648 Franklin
White, J. W., 1810 S. Rittenhouse Sq.
Whiteway, Harold M., 1924 Chestnut
Whiting, A. D., 1523 Spruce
Wiggins, E. H , 4415 N. Uber
Wightman, J. G., 2030 Wallace
Wiley, Eugene, 330 Reed
Wiley, H. E. 330 Reed
Wilkins, John W., 1914 Arch
Willard, DeForest, 1818 Chestnut
Williams, Charles B. Pennsylvania Hospital for Insane, 44th and Market
Williams, Gurney, 331 S. 13th
Williams, Horace, 1717 Pin
Williams, Rachel R., 26 S. 18th
Willits, I. Pearson, 33 West Walnut Lane, Germantown

Willson, Robert N., 350 S. 15th
Wilson, H. A., 1611 Spruce
Wilson, J. C., 1509 Walnut
Wilson, Samuel M., 1517 Arch
Wilson, W. Reynolds, 1709 Spruce
Winter, S. Elizabeth, Indwood, West Conshohocken
Wise, George G., 1340 Pine
Wister, James W., 5430 Germantown Ave.
Witmer, Evelyn, 1313 Pine
Wolfe, Samuel, 1701 Diamond
Wood, A. C., 128 S. 17th
Wood, George B., 129 S. 18th
Wood, Harold B., 324 S. 19th
Wood, H. C., 1925 Chestnut
Wood, H. C., Jr., 124 S. 22d
Woodbury, Frank, 218 S. 16th
Woods, D. F., 1501 Spruce
Woods, Mathew, 1307 S. Broad
Woods, Richard F., 1501 Spruce
Woods, Walter, 848 N. 41st
Woodward, George, 708 North American Building
Wray, William S., 26 S. 18th

Y

Yard, John B., 327 S. 18th
Yarrow, Thomas J., 1335 N. Broad
Yeager, Frank N., 2826 Oxford
Yeager, George C., 1419 E. Susquehanna Ave.
Young, James K., 222 S. 16th

Z

Zeigler, William H., 3028 Frankford Ave.
Zeigler, S. Lewis, 1700 Walnut
Zentmayer, William, 1819 Spruce
Ziegler, W. M. L., 1418 N. 17th
Zimmerman, M. W., 1522 Locust

HONORARY MEMBERS.

Browne, Lennox,	London, England.
Ferguson, E. D.,	Troy, New York.
Jackson, Edward	Denver, Colorado.
Kerr, John G.,	Canton, China.

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Nauheim and the Schott Treatment.

By A. Helena Goodwin, M.D.

[Read January 18.]

During a seven weeks' residence in Bad Nauheim this last summer my attention was called to the fact that Americans, in increasing number, were going there for the cure. In 1893 there were 117 out of a total of 10,394 cure guests; in 1902, 963 out of a total of 22,567. I was also impressed by the way in which many Americans were sent there, and so, although we have all heard a great deal in relation to this place, it is perhaps not inopportune to go into some detail in regard to it, so that we may refresh our minds with what we may expect for our patients, and how we may safeguard their interests when sending them there.

The cure at Bad Nauheim means to most of us just one thing, the treatment of abnormal heart conditions according to the methods elaborated, first by the brothers Schott and later by Theodor Schott alone.

Bad Nauheim is in the Grand Duchy of Hesse, on the direct line from Frankfort on the Main to Cassel, and three-quarters of an hour by fast train from Frankfort, eight or nine hours from Bremen and Hamburg. The town lies in the fertile plain of the Wetterau, between the Volksberg and Taunus mountains, and is the last in the chain of springs found in that region. It is about 500 feet above the sea. Bad Nauheim has 4500 inhabitants. It is preeminently a health resort, having no industry except the extraction of table salt from the saline water of the springs. This salt industry dates far back, some salt pans used by the Romans having been disinterred. As one approaches Bad Nauheim the huge structures known as Gradirbau are the most conspicuous objects in the landscape. The saline water is pumped to the top of these, trickles down over the twigs of which the Gradirbau is composed, thereby losing all its carbonic acid gas and undergoing certain changes due to changed temperature and pressure, by which most of the iron and calcium salts are deposited. It is then led to the boiling-down house, where the table salt is extracted; the residue known as Mutterlauge or mother lye is rich in potassium and calcium salts—containing according to Schott 40 per cent. calcium chlorid—and is used as needed to strengthen the baths.

The supply of water for the ordinary Nauheim Soolbad comes from this saline water after its passage through the Gradirbau.

Bad Nauheim depends for its healing virtues upon three main factors: (1) the baths; (2) the outdoor treatment in woods and park; (3) the medicinal springs or Trinkquelle.

I. The baths are of chief interest to us; they are given from three springs: No. 7, No. 12 and No. 14. No. 7, or Grosser Sprudel, bored between 1838–41 to the depth of 418 feet; temperature, 88.8° F. No. 12, or Friedrich Wilhelm Sprudel, bored 1852–55 to the depth of 585 feet; temperature, 95.64° F. No. 14, or Ernst Ludwig Sprudel, bored during the winter of 1899–1900 to the depth of 680 feet; temperature, 88.16° F.

These springs all contain carbon dioxid gas, free and combined; from 2 to 3 per cent. sodium chlorid; 0.001 to 0.002 potassium chlorid; 0.003 to 0.007 calcium chlorid.

The pipes are so arranged that a certain amount of the water is conveyed to an open-air reservoir, where the carbon dioxid gas escapes owing to lessened pressure and lowered temperature. This water is brownish in color from the precipitation of iron salts and constitutes the ordinary Thermal bath.

For the Thermal Sprudel baths the water is conveyed to an underground reservoir and from thence to the bath-house without exposure to the air; owing to the protection of pipes and reservoir most of the natural heat of the water is retained, and consequently there is no more loss of carbon dioxid gas than results from the diminished atmospheric pressure. These baths therefore make an easy gradation from the Thermal to the effervescent Sprudel baths, which contain the full quantity of carbon dioxid gas and for which the water is piped directly to the bath-tub without an intervening reservoir. The need of such a bath, between the relatively weak Thermal and the strong Sprudel, was pointed out by the brothers Schott in 1884, but the wish was not realized until 1901 with the opening of the new spring No. 14.

Therefore the patient can be started with a plain or diluted salt bath, at any temperature, and can be taken through a series culminating in the Strom Sprudel—which means that the water strongly charged with carbon dioxid gas flows in and out of the tub during the whole bath.

The amount of water used in an ordinary Nauheim bath is from 80 to 100 gallons; the tubs are of wood, because of the corroding action of the water upon metal, and are deep enough—24 to 27 inches—to cover the patient with water well up to the neck. They are 64 inches long and 27 inches wide. The baths must not be taken fasting, nor from 1 to 2 hours after a light meal; some light nourishment may follow the bath.

Absolute rest for one hour after the bath is insisted upon. Seriously ill patients use a wheel chair or cab to and from the bath; other patients are allowed to walk slowly between their apartments and the bath.

Now, as to the ordinary method pursued by Prof. Theodor Schott. The patient is carefully examined as to area of heart dulness, condition of heart muscle, circulatory system, extent of valvular lesions, amount of blood pressure and per cent. of hemoglobin. A sphygmographic tracing is taken. The patient's general condition is carefully noted, general musculature, secondary changes in lungs or alimentary tract, quantity and quality of urine. This is not only necessary in order to follow the effect of the baths, but also to decide upon the diet, the amount of exertion and the hours for rest.

Prof. Schott begins either with the Soolbad, which is a plain salt bath entirely free from carbon dioxid gas, or with the Thermal bath, which is the first of the series containing CO_2.

Usually 2 or 3 baths are given in succession and then a day's pause; in very grave cases a bath every other day only is used. The reaction of the heart muscle and the circulatory system is carefully watched. As the patient can bear it, he is taken through the course: Thermal strengthened by Mutterlauge, Thermal Sprudel, effervescing Sprudel and the strong effervescing or Strom Sprudel. The flowing or Strom Sprudel is used for a limited number of patients only; for many the effect would be far from beneficial.

The length of the bath varies from 5 to 8 minutes on beginning, to 15 or 18 minutes at the end.

The temperature varies from 95° to 89° F. When the patient is weak, anemic or has rheumatic tendencies, the higher temperature is maintained longer. Of course it is self-evident that this must vary with the case; given a large-boned, strong individual, with plenty of blood and a good deal of adipose tissue, it is necessary to use a lower temperature than 89° F., and Prof. Schott tells me that in such cases he has used flowing or Strom Sprudel with ice, continued for a half-hour. The primary effect of the baths is a slightly lowered pulse rate, slower and deeper inspirations and a slight rise in blood pressure. In the Sprudel or Strom Sprudel the stimulating effect upon the skin is very evident; when one first enters a bath at 89° F. there is a sensation of cold and slight oppression as of a weight upon chest and abdomen; this speedily passes away and the coldness is followed by a warmth of the skin which is even a burning sensation by the end of the bath and the skin takes a deep-red, even purplish tint. Bubbles of carbon dioxid gas collect over the body and at times the escaping gas is evident to the nasal mucous membrane. There are three factors at work in these baths: the temperature, the contained salt and the carbon dioxid gas. As Prof. Theodor Schott has pointed out, there is an effect upon the nerves of the skin by imbibition as well as by the direct effect of the stimulating carbon dioxid gas; and these factors combine to give us a decided influence upon the circulatory apparatus. In favorable cases the dilated or weakened heart decreases in its diameters; the apex beat moves toward the normal position; the increased muscular strength is evidenced by the character and force of the sounds; the vasomotor system is so influenced that a blood pressure persistently too high or too low grows more normal. The urine shows a higher specific gravity without decrease in amount, appetite is better and the general metabolism is improved.

This effect is gradual and is reenforced by the careful attention given to exercise. Here it is that the system of resisted movements elaborated by Schott comes into use. These are given by trained operators, slowly and with as much care as the baths. The length of the cure depends upon how the patient reacts, six weeks generally. In nearly all cases, by the end of six weeks of the baths, the patient feels a certain exhaustion, there is some nervousness, increased irritability, not such restful sleep; when this period comes they are sent to some quiet place in Switzerland or the Black Forest. The elevation must not be over 3200 feet. After a month of this rest they return for another month or six weeks to Nauheim. This after-cure is very essential and it is necessary that the patient should understand that a tour of sight-seeing is not compatible with a visit to Bad Nauheim for treatment.

The cases suitable for treatment at Bad Nauheim, according to Prof. Schott, are the various affections of the heart muscle unattended by a high grade of arteriosclerosis; lack of compensation in valve lesions; many cases of angina pectoris; neuroses of the heart; conditions following acute endocarditis or pericarditis. It is self-evident that Bad Nauheim can offer nothing where higher blood pressure would mean the rupture of bloodvessel wall, and so these advanced cases of arteriosclerosis should be kept at home. In valve lesions the baths cannot restore a shrunken valve, but they do seem able to aid in absorption of abnormal inflammatory deposits and to strengthen the heart muscle through better nourishment to it.

Contraindicated are all cases of aneurysm, advanced arteriosclerosis with liability to rupture of a vessel, acute inflammatory conditions of the heart with fever.

II. The treatment in woods and park is for the patient most valuable. Many of the apartments in villas, pensions and hotels have opportunities for meals in the open air, and balconies—sheltered from wind and sun—abound. The beautiful park occupies the centre of the visitors' quarters; it has many well-graded walks with comfortable seats, so that exercise may be combined with frequent rests in the shade of the trees.

The kurhaus has a fine terrace where afternoon and evening concerts are given daily.

There are also, about Nauheim, miles of woods in which the patients may take prescribed exercise, and this exercise loses much of its tiresomeness when one can enjoy birds, flowers and all the beauty that Nature provides so lavishly there.

III. The medicinal springs or Trinkquelle are four in number: Kurbrunnen, containing 1½ per cent. sodium chlorid; Karlsbrunnen, containing 1 per cent. sodium chlorid, and about like the Elisabethbrunnen at Homburg; Ludwigsbrunnen, with a good measure of lithium chlorid, and Schwalbrunnen, containing iron enough to be useful in cases of anemia. These waters are regularly prescribed for affections of kidneys, stomach and intestines, in conjunction with the baths.

In June, 1903, a new Inhalatorium was opened; this provides means for the inhalation of steam from the saline waters of the springs, or for the use of oxygen, compressed air or medicated vapor according to modern ideas. Catarrhal conditions of nose, throat and bronchial tubes are said to be much benefited thereby. In conjunction with this the patient is advised to sit daily in the open air near the Gradirbau and breathe the saline, ozonized air derived from the evaporation of the saline water in its descent over the twigs.

Before my visit to Bad Nauheim I thought that the words Nauheim treatment and Schott treatment were synonymous, but it did not take long for me to see the fallacy of this impression. There are in Bad Nauheim 50 physicians who are practising according to the requirements of the German law and whose names are on the official or Kurliste. There are others who practise by sufferance; these last may not write prescriptions for any poisonous drug, sign a death certificate or order a flowing sprudel bath; they would be sent away from the place if a formal complaint against them were lodged with the authorities by a physician of legal standing.

We can understand therefore how great a variety the Nauheim treatment, so-called, may embrace.

For this reason it behooves all of us to look carefully into the methods employed by the physician to whom we send our patients, so that we may be sure that the treatment they receive is what we intended they should receive.

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DISCUSSION.

DR. S. S. COHEN: Both from personal observation at Nauheim and from the reports of patients who have gone to Nauheim, I am convinced that it is absolutely necessary to send a patient to a definite physician there, either with definite instructions or with a letter asking the physician to use his own judgment as to treatment. Although Dr. Schott and the Nauheim treatment may not be synonymous, yet there can be no doubt that the method devised by Schott is carried out better by him and the persons whom he has trained than by others. There are other good physicians there, too, but the patient should not be trusted to make a choice; he may fall into the hands of an ignorant, incompetent or avaricious person.

DR. COE, Portland, Oregon: Those of us who live as far away as Portland, Oregon, cannot well send patients to Dr. Schott, and we have to get along the best we can with artificial baths. In one of the earliest of my patients in whom this treatment was tried, the water was made too strong with calcium chlorid by an assistant. This patient said that he did not come to me for any cosmetic purposes, and pointed out that from his neck down he had as few hairs upon his body as the day he was born. It seems to me that the movements that are applied form a very important part of the treatment, and I wonder whether or not the relief given to the heart by them has not a great deal to do with the results. We know that if a man who works 10 hours a day normally; works only 9 hours he is a very much better man and able to get through more easily than when he works his full 10 hours. When we consider that the heart works always, it has occurred to me it might be possible that the amount of work we are able to take from the heart, both by the stimulation of the skin and pressure upon the bloodvessels of a dozen or 20 beats in a half-hour's exercise rests the heart to a greater extent than any other device that we might be able to bring to bear.

DR. GOODWIN: Some of the people who have gone to Nauheim and who have been trained by Professor Schott do not carry out his ideas. It is a little dangerous to refer patients unless you know to whom you are referring them.

The Operative Treatment of Malignant Disease of the Mammary Gland, Rectum, Penis and Lip.

BY WILLIAM L. RODMAN, M.D.

[Read January 13.]

I was led to choose this subject for your consideration to-night after talking with a surgical friend, both of us having heard recently the papers in the symposium upon the value of the X-rays in inoperable cases of carcinoma. It occurred to me that it would not be an inopportune time to say something of operable cases, and of what we may expect at the present time, if a timely and rightly done operation be performed. It is not necessary for me to emphasize the ever-increasing frequency of malignant disease, inasmuch as that has been done by Williams, Snow, Cheyne and many others of the English school, and by Park, Warren, Lewis, Milus and others in our own country.

The reports of the Registrar General of Great Britain indicate that malignant disease is at the present time five times as frequent as it was in 1840. At that time there was one case of malignant disease to every 5,646 patients living; at the present time there is one case to every 1,306. In our own country and in Continental Europe this same increase in the frequency of malignant disease has been manifested. Roswell Park, in his Report as Director of the Pathological Laboratory to the New York State Legislature, made the statement several years ago that within ten years of that time that carcinoma would claim more victims in New York than consumption, smallpox and typhoid fever combined. When we remember that each of these three diseases is decreasing in frequency, and that to a large extent all are preventable, we can understand how such a prophecy as this may be fulfilled. Certainly the conservatism of Park and the care with which he made this prophecy, basing his estimate on figures in New York State for the preceding eleven years, would indicate, at least, the increasing frequency of malignant disease.

Williams estimates that there are more than 10,000 people in England and Wales alone with mammary carcinoma. Before taking up mammary carcinoma I wish to say a word about the anatomy of the mammary gland. We should remember what Mr. Stiles of Edinburgh says, that there is no capsule to the mammary gland and that, therefore, it is a very common thing to have outlying glandular elements. These may be in the axilla or they may be in the most unexpected situations. One should always have the possibility of outlying glandular rudiments in view and should make wide incisions. The second and more important anatomical point is the fact that the lymphatics of the mammary gland are more important than was formerly taught by Sappey and other anatomists. Instead of the single chain of lymphatics beginning at the areola and following along the skin to empty finally into the axillary nodes, we find there are several other chains which are just as important. There is a second chain of superficial lymphatics which drains the skin of the axillary portion of the gland. These vessels pass internally, perforate the second and fourth intercostal spaces and empty into the mediastinal glands. In addition, there are three deep sets: one which begins in the milk ducts and acini, which drains the axillary portion of the gland and, passing superficially, unites with the first set and with it forms a network passing around the axillary vessels up to the clavicle where they discharge. A second set drains the sternal half of the gland and passes with the second superficial set through the second and fourth intercostal spaces along with the internal mammary artery and empties into the anterior mediastinal glands. A third set drains the retromammary tissues and perforates the intercostal spaces to pass along with the intercostal arteries to the vertebral column. In that way we can understand the not infrequent metastasis of malignant disease to the vertebral column, resulting in paraplegia.

I think that, undoubtedly, the statistics of Americans and Germans, concerning the results of the operative treatment of malignant disease of the breast, are rather too optimistic, so far as the immediate mortality is concerned. It is easy to collect many individual series of from fifty to 125 cases without a single death. These results cannot be accepted as average ones. I think the one per cent. put down by some American authors is too small. I think the 12 and 15 per cent. of the English and of many of the Germans is too large; but I would say that from 3 to 5 per cent. should represent the outside mortality in a very complete operation on the mammary gland at the present time. It would not appear that the more extensive operations, such as Halsted's, in which both muscles are removed and the axilla thoroughly cleaned out, are any more serious than the minor operations. Halsted had a series of seventy-six cases without a single death. Many others have had a large series without a death. In my own experience I have not been so fortunate. In rather more than 100 operations upon the breast I have had two deaths; one, in an elderly woman, seventy-six years of age, a patient of Dr. William E. Hughes. She died suddenly ten or eleven days after the operation from heart failure. She had a marked murmur which we recognized at the time of the operation. I, however, attribute her death to the operation, and count it an operative death. The other case was a patient, forty-three years of age, who had a very large breast and an enormous growth in the axilla which required a most extensive operation. She was under the anesthetic for three hours, and died as the result of the ether on the third day. There was complete suppression of urine after twenty-four hours, and only four ounces were secreted on the first day. I think that at the present time as we get cases, many of them late, with extensive glandular involvement, that we cannot hope to produce a radical cure in more than 33⅓ per cent. I think it is conservative at the present time to state that at least one-third of such cases ought to be cured, even though they be cases of the second and third degree, in which there will be not only axillary involvement, but also a more or less fixed mammary gland. We find, however, more optimistic reports, some surgeons claiming 50 per cent., and one as high as 85 per cent. Of my six cases of cure after operation, one has gone six years; one has gone five years; two have gone four years; two have gone just barely over three years. One patient who was operated on in November, 1900, is here to-night.

The first cure that I had was really the most gratifying one of the series. In the Fall of 1897 I operated upon a patient for Dr. H. B. Critzman of Welch Run, Pa., who had been operated upon twice before. There was extensive recurrence in the sternal half of the gland and marked axillary involvement. I made one of the most complete operations that I have ever done. I saw the physician about a year ago and asked him how long that woman lived after the operation. He said: "I saw her yesterday. She is in perfect health and uses her arm as well as ever in her life, and asked to be remembered to you." Five years after the operation she was perfectly well in every respect.

One case which I would like to speak of is that of a young colored woman, reported to the Philadelphia Academy of Surgery three years ago. She was operated on for recurrent malignant disease. There was recurrence for which a second operation was performed, and at this operation a large number of glands were removed from the neck, there being a mass in the subclavian triangle as large as a lemon. There was a further recurrence, and for this a third operation, which was the most extensive I have ever done. The woman was only twenty-three when the carcinoma began; in my experience that is a bad prognostic sign. The younger the case, the more rapidly fatal it is. This woman is in fairly good condition to-day, considering the recent and rather extensive operation; it being necessary to resect parts of two of the ribs and a portion of the sternum so that the pleura was exposed. She recovered from the operation very nicely, and so far as I can judge there are no metastases elsewhere. That, of course, cannot be counted as a cure, and I only report it to express my surprise that she is alive.

I wrote to Professor Halsted asking what had been his results with recurrent cases and I have his letter from which I will read an extract:

"We have only once or twice succeeded in saving a case of recurrence of carcinoma of the breast. The case which you speak of is certainly a remarkable one and I imagine very few have made this experience. I shall be much interested to know if the axillary glands were involved at any time in this case. One of the cases of recurrence saved by us had supraclavicular glands involved as well as axillary. At the second operation a portion of the subclavian vein, as well as the supraclavicular glands, were removed. Another case was an adenocarcinoma, without glandular involvement. She had had several recurrences before consulting us, and was cured by the operation at the Johns Hopkins Hospital. Last spring I operated upon a case of colloid carcinoma, the second recurrence, I think, but in this case at the time of my operation there was no glandular involvement; the first operation was performed five or six years ago, I think. I shall be interested to know if you have cured any cases with supraclavicular involvement."

There was, as I have said, extensive axillary involvement.

Malignant disease of the penis is nearly always carcinoma. A dozen or more well-authenticated cases of sarcoma have been reported, but practically the number is so insignificant that they need not be reviewed. These growths are usually of the squamous epithelial type, but scirrhus may occur. The anterior part of the penis is the part usually involved. As a rule, the incision is made three-quarters of an inch posterior to the lesion. I have here to-night a patient who was shown to this Society immediately after the operation three years ago. He weighs eight pounds more than he did at the time of the operation. He is absolutely free from recurrence, never had the slightest difficulty with micturition and has intercourse as well as formerly. The glands were removed from both groins and the wounds united by first intention. The scar of one side is very faintly visible to-day. I would be glad to have the patient examined, because the natural skin covering of the penis is as good as one could wish to see.

In a second case there was a very extensive epithelioma of the penis. The organ was removed close to the body and the glands were removed from both groins. On the right side particularly there was such extensive glandular involvement that in my manipulation of the femoral glands I ruptured the saphenous vein and had to resect it. Butlin reports twenty-three cures in sixty-five operations, or rather more than 35 per cent. We should do better by present methods.

In all I have records of five undoubted cures of carcinoma of the penis. In 1892 I operated upon a man sent by Dr. Thos. L. McDermott, of Louisville, Ky., and he was alive and in perfect condition at the last report from Dr. McDermott one year ago. In 1896 I operated upon a man about seventy years of age, sent also by Dr. McDermott. The last time I was in Kentucky, less than a year ago, I found that he was entirely well and free from recurrence. A third case operated upon at my clinic in the Kentucky School of Medicine was sent to me from Lebanon, Ky., in 1896.

The immediate mortality from operations upon the penis should not be more than 1 or 2 per cent. Butlin, from a large number of cases, makes a mortality of 4 per cent. when the knife is used, and 14 per cent. when the galvanocautery is employed. I cannot understand why there should be this mortality, unless many of these cases became septic; since it oftentimes is almost impossible to keep from infecting the wounds made in the groins. Even though infection takes place, I cannot understand why the mortality should be as great as 4 per cent. I have had no deaths myself.

In all cases of amputation of the penis I insist that the operatioy is not completely done, unless the groins be opened, whether then seem to be involved or not. I recall a sad case in which failure to operate upon the opposite groin caused me to lose my patient, who otherwise might have been saved. In 1890 I saw a patient with Dr. Peyton, of Jeffersonville, Ind., and while we did an extensive operation on the penis and opened the groin, which was visibly affected, we failed to open the opposite groin, because it did not seem to be involved. The man lived about two years and died from recurrence in the groin not operated.

I have not had a great number of operations upon the rectum. I have one case in the anteroom operated upon about one year ago. The man has gained eighty pounds since operation. He was cachectic at the time and had a most extensive carcinoma of the rectum. I removed the lower four inches by the perineal route and did a preliminary colostomy. He is absolutely free from recurrence, but, of course, a year is too short a time to reckon the case a cure. Another case operated upon two years ago assures me of no return, and I feel that the patient has nearly passed the danger limit. Mr. Cripps insists that if recurrence does not take place within three years it will not at all. I believe the primary mortality for excising the rectum should not be more than 3 to 5 per cent. by the perineal route. It will be at least 10 per cent. with the Kraske method or its various modifications. McCosh reports 439 cases with a mortality of 19.1 per cent. That method enables the operator to get out the glands in the sacrum more easily. I prefer when practicable to perform the operation by the perineal route. As to ultimate results, Butlin reports 100 cases with twenty-one recoveries; all had passed the three-year limit. That is as good as we can expect. With the more complete operations now done we will probably get a larger per cent. of cures.

Carcinoma of the lip gives the most hopeful prognosis of malignant disease anywhere. Butlin reports a very large number of cases and he estimates that the primary mortality is much greater, I am sure, than any one would think, between 7 and 8 per cent.; 1010 cases with seventy deaths. This is on account of the fact that so many operations are extensive and embrace not only the enlarged glands below the jaw, but also the bone, which is excised very freely. So far as the ultimate results are concerned Butlin estimates 53 per cent. of cures. I am sure that this does not overstate it. I have an impression that surgeons at the present time are curing more than half of their cases of epithelioma of the lip. Whether the submaxillary triangles seem to be infected or not, they should be opened and any suspicious parts removed. It is just as difficult to detect enlarged glands here as in the axilla before an incision is made. If this is done in every case, I have no reason to doubt that we will cure not only 53, but practically 75 or 80 per cent. of such cases.

DISCUSSION.

DR. JOHN B. DEAVER: I prefer to close the wound after amputation of the breast. To allow the wound to heal by granulation or after skin grafting seems to be ideal so far as radical operation is concerned, but not from the standpoint of the patient's comfort. The earlier we operate the better the operative result. Dr. Rodman detailed the lymphatic supply of the breast, which is the keynote to the importance of early operation. We know that the most favorable class of cases is that in which the growth is situated in the upper and outer quadrant of the breast, and in which there is no involvement of the skin of the axilla. It is rare in early cases of carcinoma of the upper and outer quadrant to have secondary skin involvement of the axilla, but when there is secondary skin involvement we can see how we can have mediastinal involvement and within a year a mediastinal growth following what was apparently a most favorable case when first seen. I do not know how many operations I have done; I should say between 500 and 600. I average about 40 a year, and I have never lost but one case shortly following operation. The patient was a very feeble woman who died of sepsis. The operation I practice is that which Dr. Rodman advocates, the Halsted operation. There is no doubt that to obtain a cure the most radical dissection must be made. I believe this operation is only applicable to early cases. It is useless to do a Halsted operation in a patient already cachectic, who already has excessive glandular involvement. Not being able to feel the axillary glands does not argue against their enlargement. In doing the Halsted operation we should avoid injury to the long subscapular and internal thoracic nerves especially. If we injure the long subscapular nerve we know that it interferes with the action of the latissimus dorsi muscle. We have 2 varieties of edema following operations on the breast: (1) that which appears almost immediately after operation and (2) that which appears after 2 or 3 months. When the edema comes on shortly after operation it is the result of the removal of the support to the axillary vein. This form of edema is apt to be quite pronounced above the elbow upon the inside of the arm. The edema appearing 2 or 3 months after operation is either the result of recurrence in the armpit or of contraction consequent upon the dissection in the axilla and obstruction to the axillary vein. It is my practice to advise massage for the correction of the first variety of edema at any rate, and in that appearing later also, if I am satisfied it is not due to recurrence of the growth in the axilla. I rarely do an operation that I do not remove both pectoral muscles. I regard the X-ray treatment of carcinoma beneath the skin as of practically no use. I regret that so much has been written upon the X-ray treatment of carcinoma when there has been so little foundation upon which to make what strikes one as almost if not quite positive statements. I think that the application of the X-rays after operation for the removal of breast growths is of no moment. I do think it is capable of making the patient very uncomfortable either on account of an occasional abscess or an occasional burn. It is the practice of all surgeons, if in doubt, to have the growth removed and subjected to microscopic examination. Very frequently this examination spares a woman her breast. It is impossible for any man to tell in all cases whether he is dealing with a malignant or a nonmalignant growth of the breast until it has been removed and microscopically examined. I was glad to hear Dr. Rodman lay special stress upon the importance of removing the lymphatic glands on both sides of the groin during the operation for malignant disease of the penis. I never operate upon carcinoma of the lip, unless I remove the submaxillary lymphatic glands of both sides of the neck, and I have many such patients living to-day. I operated upon a case of carcinoma of the lip 3 years ago. This fall the patient came into my office with what I thought was an epithelioma on inner side of cheek at the angle of the mouth. He had been treated with the X-rays for 6 months. The growth was removed and examined by Drs. Kelly and Müller and found to be a benign growth. I have had a fair amount of experience with cases of carcinoma of the rectum, and the more cases I see the more inclined I am to send them to my neighbor for operation. The vaginal operation for the removal of the rectum in the female offers more prospect of good result than the Kraske. When I resect the rectum and bring down the rectum or the sigmoid and make an end to end anastomosis with silk sutures I get very good immediate results. My experience with these cases is that we usually have recurrence in about 18 months. I believe that unless we see carcinoma of the rectum very early, the patient is benefited more by colostomy than by operation on the rectum.

DR. MORDECAI PRICE: I am thoroughly convinced that none of us know anything about the pathology or the nature of carcinoma. I once heard Dr. Gross say that he had a patient who had been operated on 21 times, and then, after a period of 7 years, she had a recurrence. Eighteen months ago a woman came into the hospital with a large carcinoma of the right breast with involvement of the axillary glands. I removed the breast and cleaned out the axilla thoroughly and then operated twice more within 4 weeks. A lump in the scar as large as my fist developed within the first week and another small one before she got out of the house. To my surprise, a week ago she came into my office, absolutely well, without a particle of induration or shadow of trouble in that axilla or breast. I have on quite a number of occasions done operations which were not followed by recurrence. I remember what old Dr. Gibson said in speaking to his class: "Gentlemen, I am going to operate on this lady for removal of the breast; if it is cancer, it will come back; if it is not cancer, I will cure her." I am convinced that many of the tumors removed for carcinoma of the breast are not malignant. Two or 3 years ago I removed a small growth, the size of a hen's egg, which the pathologist said was perfectly benign. In 6 months the woman was dead from carcinoma. I am convinced that every growth in the mammary gland should be removed. Every lymph gland that can be gotten out should be removed with the fingers. You can remove every single, solitary vestige of the glands in the axilla and under the clavicle without removing the pectoral muscles and do it safely with the fingers. I do not feel that I am going to cure my patient when there are adhesions between the breast and the pectoral muscles. Carcinoma of the intestine with obstruction which assumes more of the epithelial form is curable in many instances. I operated for Dr. W. Burnes for an epitheliomatous growth in the small intestine, resecting 8 or 10 inches of bowel and the woman lived for 6 or 7 years. My impression is that if we could keep track of these cases we would find recurrence.

DR. COLLIER FORD MARTIN: Personally I have never performed the radical operation for carcinoma of the rectum; I have always done as Dr. Deaver says he feels like doing—referred the case to another. I have seen several cases, every one far advanced. I think none of them were suitable cases for the radical operation, if cure were to be obtained; if relief were looked for, however, they were suitable cases. The great trouble is that the average patient comes too late. Fortunately, in the last few years, more attention has been paid to the rectum, and examinations are made when the patient presents symptoms of alternate attacks of diarrhea and constipation; although I have never yet had a case in which diagnosis was made early. It is important to remember that in the rectum we have growths like papillomata and adenomata that are on the border line of malignancy. In one case I removed a mucous polyp from the rectum and a year later the patient returned with a well-developed carcinoma. I think it is of great importance not to leave these other conditions which we call minor conditions, polypi, adenoids and other semibenign conditions untreated. They should be removed and removed radically, removing, if necessary, some of the mucous membrane around the base with the pedicle, and watching the case afterward. Such a patient should present himself regularly for examination. I make it a rule that these examinations shall be made at periods of from 3 to 6 months for a year or so, in order to assure myself that there is no danger of carcinoma.

DR. G. E. PFAHLER: I feel that the black eye which has been given to X-rays should not be passed unnoticed. Being a young man I shall not express my own opinion; I shall only refer to the opinions of older and more experienced men. Fifteen months ago a patient was examined by Dr. Da Costa; the patient had been operated on twice for carcinoma of the breast. The second time it had recurred within 3 months after operation. Dr. Da Costa gave the patient 6 months to live. A year afterward, after a course of X-ray treatment, when he again saw the patient, he could find no evidence of the disease, and the patient is living to-day. I could cite similar cases treated for Dr. Laplace and Dr. Rodman.

DR. RODMAN: There is but one operation at the present time for malignant disease of the mammary gland and that is Halsted's operation. By tearing out glands with the finger lymph channels are opened up and regional recurrence made probable. The breast, the muscles, the fat and the enlarged glands up to the clavicle should all be removed *en masse* Tearing has no place in modern surgery. I have not operated on many cases of carcinoma of the rectum, as few favorable ones have presented themselves. Carcinoma on the posterior wall is favorable for operation, but growths on the anterior wall, on account of vesical and prostatic involvement, are distinctly unfavorable. The X-rays are of value in certain cases. I would even go so far as to say that in very extensive infiltration, when one is in doubt as to whether or not one has removed all of the disease, it is best to supplement operative procedure by a regular course of the X-rays. I have seen mediastinal enlargement melt away under the X-rays, but no permanent good was accomplished, as the patient afterward died of paraplegia due to metastasis in the spinal column. The point is that we do not know whether the relief will be abiding. The X-rays should never be used in an operable case, because we can expect more from an operation rightly done than we can from them. The rays, in my judgment, promise little in mammary carcinomata. In the superficial squamous epitheliomata about the face the rays are a valuable means of treatment, inasmuch as they seem to cure with a minimum amount of scarring. Moreover, enlarged glands are not a feature of such growths. Wherever there are enlarged glands I expect no abiding results from the X-rays.

A Study of Ninety-one Cases for the Relief of Various Forms of Hernia with Their Complications.

By ORVILLE HORWITZ, B.S., M.D.

[Read January 27.]

The operations performed by us for the relief of various forms of hernia as here set forth represent the work achieved during the past twelve years in private practice, at the Philadelphia Hospital and at the Jefferson Medical College Hospital. Unfortunately the majority of patients were inmates of either one or the other of these establishments, and consequently many were lost sight of after they had quitted those institutions, so that the number of cases which permanently recovered after a radical cure had been attempted cannot be definitely ascertained. The opportunity has been afforded us in twenty-nine cases to watch the permanency of the results obtained by operation, and from this number we are in a position to give some definite information regarding the subject.

As none of the cases under consideration was adapted to the employment of any of the palliative measures in vogue which are applicable to so many forms of hernia, this important division of the subject will not be considered in the study of the cases herein recounted.

The various operations performed are classified as follows: thirty-two cases indirect inguinal hernia (strangulated); twenty-seven cases indirect inguinal hernia (radical operation); eight cases indirect inguinal hernia (palliative); five cases direct inguinal hernia (strangulated); one case direct inguinal hernia (radical operation); three cases direct inguinal hernia (palliative); three cases femoral hernia (strangulated); two cases femoral hernia (radical operation); three cases umbilical hernia (strangulated); three cases umbilical hernia (radical cure); four cases ventral hernia (incisional), radical operation.

The complications were: one case of bilateral hydrocele with inguinal hernia; radical cure. Two cases of unilateral hydrocele, inguinal hernia; radical cure of both. One case of tuberculosis of testicle, inguinal hernia; castration with radical operation for hernia. Four cases of inguinal hernia with undescended testicle; castration and radical operation for hernia. Three cases of inguinal hernia with undescended testicle; transplantation of testicle and radical operation for hernia. One case of inguinal hernia with encysted hydrocele of cord; radical operation for both conditions. One case of long-standing strangulated femoral hernia, gangrene of bowel with rupture, necessitating abdominal section (Richter's hernia). One case of hernia reduced *en masse*, necessitating abdominal section. One case of appendiceal abscess rupturing into an inguinal hernia sac. One case of long-standing hematoma of the tunica vaginalis testis with large incarcerated omental hernia simulating malignant disease of the testicle. In two cases of strangulated inguinal hernia an ovary was found in the sac in one, and a portion of the bladder in the other. Gangrene of the constricted bowel in seven cases necessitated the establishment of an artificial anus; bowel opened without disturbing constriction and left *in situ* in one; resection of bowel in three cases and the removal of a doubtful spot about the size of a thumb-nail, with closure of the opening in one.

Death ensued in sixteen cases, as follows: one femoral, two umbilical, one direct inguinal, twelve indirect inguinal. In twelve of the cases death was due to peritonitis; strangulation had existed for many hours before resorting to operations, taxis having been persisted in for a lengthened period without avail. Of the four remaining cases, one died from exhaustion, one died from intestinal perforation of a damaged bowel following operation, probably caused by intestinal distention succeeding paralysis of the bowel. Death occurred on the fourth day after the operation. In one, in which the individual suffered from chronic Bright's disease, uremia was developed. In this case local anesthesia had been employed. The remaining case was one in which a radical operation had been attempted for the relief of a large reducible hernia. Examination of the urine before operation showed the kidneys to be healthy; suppression of urine intervened, and the patient succumbed.

Operations for the relief of hernia may be divided into three classes: (1) Herniotomy, an operation which is performed when strangulation exists; it is always an emergency operation, the mortality depending not only on the age, character of the hernia and condition of the patient, but is greatly influenced by the length of time that the protrusion has continued, as well as the amount of force put forth, and the duration and frequency with which attempts at taxis have been made.

(2) The so-called "radical operation," in which the hernial protrusion is not strangulated and an effort is made to effect a permanent cure.

(3) A palliative operation, by which is meant surgical intervention in cases in which, owing to the large size of the hernia, atrophy of the muscular structures of the abdominal wall ensues; the large size of the hernial outlet and the changed condition of the inguinal canal exist, and a permanent cure following a radical operation is not to be hoped for. Nevertheless, in properly selected cases, individuals suffering from this condition are materially benefited by surgical interference. The general health improves; the obstinate constipation so frequently associated with this state is relieved. The annoying sensation of abdominal tension and pain disappears, the patient being able to keep the contents of the hernial protrusion within the abdominal cavity by means of an apparatus, an impossibility before surgical interference.

Forty-two operations were performed for the relief of different forms of strangulated hernia; of which number three were femoral, three umbilical, five direct and thirty-two indirect inguinal. It is significant to note that in every instance in which death resulted from herniotomy the operation had not been performed for several hours after the constriction occurred, and in almost every instance violent and prolonged taxis had been made at short intervals for a lengthened period of time. In one case, that of an old man, seventy-three years of age, the strangulation was unrelieved from four o'clock in the morning until eight in the evening, during which time the patient was kept constantly under the influence of ether, taxis being frequently resorted to. On opening the sac the tissues were found to be blood-stained and the serous coat of the bowel stripped off in patches. The intestines presented a most doubtful appearance. Reports of many similar instances are to be found in the literature on the subject.

We believe that gentle taxis should be attempted for the period of about ten minutes after the strangulation occurs. Should this fail, preparations should at once be made with a view to an operation. As soon as the patient is under the influence of an anesthetic, another gentle effort should be made to relieve the constricted bowel; if this does not succeed an immediate operation should be resorted to. It is generally conceded that taxis of a strangulated femoral hernia is fraught with more danger than that of the inguinal variety (Crowley). Cases are recorded of rupture of the bowel occurring in violent efforts at reduction in femoral hernia; statistics prove that there is more danger of a reduction taking place *en bloc*, when the protrusion occurs at the femoral than at the inguinal outlet. Taxis, therefore, can be persisted in for a longer period and with less danger when the rupture is of the latter than of the former variety. It is true that in a small percentage of cases delay, the local employment of ice, etherization and taxis will sometimes result in relieving the strangulation. The number of cases in which this method of treatment succeeds is so small in comparison with the numbers that fail that it is wise to err on the safe side and operate early, thereby preventing the individual being brought to the operating table with a damaged intestine, and reducing the chance of recovery. We feel assured that no modern surgeon would be content, after a fair effort at taxis had failed, to allow several hours to elapse without affording operative relief to the patient, and would object to trusting to time and renewed resort to taxis to reduce the hernia. Symptoms of intestinal obstruction persisting after reduction of a strangulated inguinal hernia call for immediate abdominal section, as the probability is that the hernia has been reduced *en masse*. One symptom that we have observed to be frequently present, characteristic of acute intestinal obstruction, is the peculiar character of the uncontrollable vomiting; the individual turns on his side and ejects a large quantity of watery, mucoid material, sometimes tinged with greenish bile. This is repeated at short intervals until the bystanders frequently wonder whence all the fluid matter is derived.

Of the cases of inguinal hernia operated upon, with the exception of three, these being among the earliest herein recounted, the incision employed was similar to that made for the radical cure in non-strangulated cases. The advantage of this mode of exposing the sac over the old method of raising a fold of skin at right angles to the external abdominal ring, and transfixing it, is too obvious to need any comment. In two cases in which the bowel was gangrenous, the general condition of the patients being desperate, the constriction was not molested; the gangrenous portion of the bowel was freely incised and left *in situ*. One individual recovered, and the other died, apparently from exhaustion, the patient being well-nigh *in articulo mortis* at the time of operation. In a third case the gangrenous portion of the intestine was resected and the divided ends of the gut stitched to the edges of the wound. This person recovered with the formation of a fecal fistula. In three cases resection of the gangrenous portion of the intestine was performed, one being a strangulated femoral hernia, the so-called "Richter's" variety already alluded to; the second a strangulated umbilical hernia, and the third an indirect inguinal hernia. The latter recovered; the other two died of peritonitis. In one case it was found that the area of gangrene was limited to a spot about the size of a thumb-nail. This was resected and the wound closed by continuous Lembert suture. The patient made an uninterrupted recovery. The Murphy button was employed in one instance, the patient's condition being such at the time of operation as not to warrant unnecessary delay. In one case, the O'Hara anastomosis forceps was employed and found to be most satisfactory. We, as a rule, do not advocate the employment of any of the various instruments devised to accelerate the operation of intestinal anastomosis. We have been able to resect an anastomosis quite as quickly without the aid of any of the devices suggested as with them. It is a great advantage to acquire the dexterity of operating rapidly without being hampered by the use of special instruments.

The advantages to be derived from a resection of a gangrenous bowel with anastomosis over that of establishing an artificial anus are too evident to need comment. It is only in those cases in which the patient's condition is such that any unnecessary delay would add to the danger of a fatal result that an artificial anus should be established. Local anæsthesia was employed in cases in which the patient's condition at the time of operation was desperate. It was not found, as is so frequently claimed, that the intestine could be manipulated without pain.

In every instance in which the patient's condition warranted the attempt, an effort was made to effect a radical cure after the constriction had been relieved and the contents of the sac returned. The additional work necessary to produce a permanent cure, as a rule, requires but very little additional time and should always be attempted whenever possible. In cases in which general peritonitis existed accompanied by paralysis of the bowel, the method of treatment suggested by Dr. Andrew J. MacCosh (*Ann. Surgery*, June, 1897) was adopted:

Two ounces of a saturated solution of magnesium sulphate were injected into the small intestine as high up as possible by means of a hollow needle attached to an aspirating syringe, the little wound in the bowel being closed by means of a Lembert suture. We are convinced that in at least three cases life was saved by this means of treatment. When peritonitis was present the abdominal cavity was irrigated with a large quantity of hot normal salt solution and drained. If there had been no injury to the bowel, ten grains of calomel were administered as soon as the patient had recovered from the effects of the anesthetic. A large dose of the mild chloride of mercury in paralysis of the bowel, with marked distention, is always beneficial; not only does it have a tendency to induce peristaltic action, but it is an excellent diuretic, having a proneness to prevent suppression of urine which sometimes accompanies abdominal complications. Small doses of the remedy, repeated at short intervals, will not produce the active vermiculation which is obtained by the administration of a single large dose.

In one case of strangulated hernia, on opening the sac after separating the omentum and intestines, there was found to be, lying posteriorly, what appeared to be a cyst. The nature of the cystocele was not at first recognized, protrusion of a portion of the bladder being suspected; the urine was withdrawn by means of a catheter, when the tumor immediately subsided, thereby verifying the diagnosis. There were no symptoms present before operation which would tend to show that the bladder was in any way connected with the hernia. We have had the opportunity to observe two similar cases; they were inmates of the Philadelphia Hospital, and came under the care of our colleagues. In neither case were there any symptoms present that would lead a surgeon to suspect that the bladder was in any way implicated. In one of the patients the bladder was opened by mistake and in the other the organ was recognized and returned to the abdominal cavity. Hernia of the bladder may occur alone or it may be associated with a protrusion of the intestine and omentum. The diagnosis of the condition is but rarely made before operation. The condition may be suspected if there is an unexplainable frequency of micturition, and the history of the tumor shows that it diminishes in size or disappears after urination. The suspicion that the bladder forms a portion of the hernial contents can be determined by drawing off the urine by means of a catheter. On removing the urine the size of the swelling will diminish; after evacuating the bladder it can then be dilated by means of either air or water and the tumor will immediately reappear.

Hernia of the bladder alone may be mistaken for an ordinary hydrocele or a hydrocele of a hernial sac. Several cases are on record in which a hernial protrusion of the bladder has been tapped under the belief that the cyst was a hydrocele of the vaginal tunic. On opening the sac the bladder may be recognized, if present, by the discovery of what appears to be a cystic tumor, which usually forms part of the wall of the sac. The usual presence of fat over the cyst and outside of the sac, the characteristic unstriped muscular fibers composing the wall of the bladder, and also occasionally the longitudinal veins which are found in the vicinity of the fundus of the organ, which are frequently much engorged and consequently prominent should aid in making a proper diagnosis. Moreover, when the sac has been twisted, preparatory to resection, if the bladder be included, suspicion should be aroused by the unusual thickness of the structure.

When a portion of the bladder is found to form a portion of the contents of the hernial sac, it should be freed from any adhesions that may exist and returned to the abdominal cavity. Should the protrusion of the viscus assume the form of a diverticulum, it is generally considered wisest to resect the pouch and close the opening made in the bladder by two rows of sutures.

In a private case operated upon at St. Joseph's Hospital for what was presumed to be an incarcerated inguinal omental hernia, the sac was found to contain the ovary and Fallopian tube with a piece of indurated omentum. The latter was resected and the ovary and tube freed from adhesions and restored to the abdominal cavity. The tumor had existed for three years, during which time it had been gradually increasing in size with increased induration. The patient stated that it was the seat of much pain during menstruation. The cause of this was inexplicable before operation.

Little is known as to the etiology of hernia of the ovary. The diagnosis is but seldom ascertained before the operation. The condition may be either acquired or congenital, the latter form being the most common. The sac may contain only the ovary or the Fallopian tube; both structures, however, may be present, associated with other viscera. The rupture usually occurs on the left side; cases are on record in which the protrusion has been bilateral. Statistics show that the inguinal variety is by far the most common. The ovary has been found in Scarpa's space and even in the obturator foramen. So far as we have been able to ascertain, there is no case on record in which the ovary has been found associated with a femoral hernia.

A study of hernia and its literature during the past fifteen years shows that the subject of its radical cure has exercised the ingenuity and talents of surgeons to a remarkable degree. Different methods of attempting to effect a radical cure of the inguinal variety have been suggested by as many as twenty-five operators, viz.: Ferguson, Nélaton, Ombredane, Bernhardt, Deaver, Ball, Stimson, Landphere, Mayhean, Phillips, Czerney, Socin, Thomas, Schawtz, Barker, Martin, MacCuen, Bloodgood, Eccles, Beck, Fowler, Kocher, Halsted, Bassini, and Benjamin. These gentlemen each recommend a different method of operating in hopes of achieving success.

Many of these operations still have their advocates; some are forgotten; others have fallen into disuse; a few are yet on trial. The fact that so many different methods of operating are still to be tested would seem to prove that the proper method thus far to be selected in the hopes of procuring a fundamental cure, depends on the particular condition that each case presents, as well as the character of the tissue of the individual with whom the operator has to deal. As Eccles very aptly puts it: "A uniformity of procedure in suturing the canal implies that all inguinal hernias are alike and implies similar treatment,—a fact that experience entirely and necessarily discredits, *each case having to be dealt with on its own merits.*" This statement appears to us to be the keynote of the situation and explains why a particular operation will not succeed in each instance, and hence the existence of so many different methods to effect a radical cure that are in vogue.

In spite of the fact that the profession is at variance as to the most suitable operation to be selected for the radical cure of hernia, accumulated evidence derived from a large number of different operations has narrowed the choice of methods adopted by the majority of surgeons in this country down to a few, which may be enumerated in order of their popularity as the Bassini, Halstead, Kocher, Bloodgood, and Fowler, the last named being still on trial. Each has its advocates. As has been already pointed out, none is probably suitable to every variety of inguinal protrusion. Frequently the surgeon must use his ingenuity and experience as a guide to the best method of procedure.

The popularity and confidence evinced by the profession in the United States for the Bassini operation are probably largely due to the writings of Bull and Coley, who published an article in the *Annals of Surgery* for 1898, in which it is demonstrated that attempts to effect a radical cure of inguinal hernia were disappointing until the Bassini method of operating, together with the employment of the absorbable sutures, was adopted. The results of 1053 operations are tabulated, of which 522 were performed by Bull and 531 by Coley.

From our own experience and from the knowledge gained from the study of the literature of the subject, we have learned to believe that the Bassini is the proper method to pursue for the radical cure of the majority of patients afflicted with inguinal hernia; but cases will arise from time to time in which we must deviate from the directions suggested by Bassini and select some other means of operating in order to effect a cure. When the conjoined tendon is either so attenuated or so obliterated that Hesselbach's triangle has lost its strongest support, transplantation of the rectus muscle is employed after the method suggested by Bloodgood (*Bull. Johns Hopkins Hosp.*, May, 1891); the remainder of the operation is performed by the Bassini method.

Whilst some authorities still advocate aseptic silk and silver wire for the buried sutures when closing the various structures, the mass of clinical evidence is against their employment, the material of choice being kangaroo tendon and chromicized catgut.

Of twenty-nine cases in which a radical cure was attempted, whose after course could be traced, the result may be tabulated as follows: eighteen indirect inguinal; Halstead one; Fowler one, and the remaining after the manner suggested by Bassini. Six indirect inguinal hernias; strangulation existing at the time of operation. In these cases after relieving the constriction, the Bassini or Bloodgood operation was performed. One indirect inguinal hernia; Bloodgood operation. One ventral hernia, following a celiotomy. Two umbilical hernias; one the ordinary method, the other the Mayo operation. One femoral hernia; Bassini method.

Of the eighteen cases of non-strangulated inguinal hernia, all have remained permanently cured for a period varying from one up to ten years, save in one instance, in which a recurrence took place one and a half years after operation. In this instance the protrusion was large and had existed for several years, during which time a truss had been constantly worn. The case was one in which a Bloodgood operation should have been performed. Unfortunately the radical cure was attempted before this method of operating had been suggested. Of the six cases in which a radical cure was attempted at the time that the strangulation was relieved, one recurred in nine months and another two years after operation, this patient being seventy-three years old when the herniotomy was performed, the hernial protrusion having existed fifteen years. In none of the remaining cases has recurrence taken place. Only six months, however, have elapsed since the operation for relief of femoral hernia was performed. Clinical evidence has shown that if a recurrence is likely to occur, it usually takes place within six months after the operation, and that the chances of recurrence are greatly diminished after one year.

The case of umbilical hernia operated upon after the method suggested by Mayo has been found to be the most satisfactory for the relief of this form that we have ever employed. It is nine months since the operation was performed, and up to this time the individual continues in excellent health; there is no tendency to recurrence.

In the cases in which either a unilateral or bilateral hydrocele existed as a complication the hydrocele was partially resected in one, and in the two remaining patients the Doyen method was adopted. All made uneventful recoveries. So far, there has been no tendency to a recurrence of either the hernias or hydroceles. In the case of hydrocele of the cord, the tumor was the size of a small orange, which was dissected out in its entirety.

In the case of tuberculosis of the testicle complicated with hernia, it was found necessary to resect the entire vas deferens together with the removal of the testicle. Two years have elapsed since the operation; so far there has been neither a return of the rupture nor any evidence of further tuberculous infection. It is true that the patient has had the advantage of fortifying his constitution by a sojourn for a year and a half in New Mexico.

In seven cases of undescended testicle, associated with inguinal hernia, one was an iliac retention, the testicle being found in the iliac fossa near the internal abdominal ring. In the remaining cases the organ was located either in the inguinal canal or at the external abdominal ring. In four of the cases the hernia had insinuated itself beyond the retained testicle and had passed into the scrotum. In one case the presence of the testicle prevented the protrusion of the bowel beyond the external ring. In this case both the rupture and the testicle were found in the inguinal canal.

If the individual with an undescended testicle is under thirty years of age and is strong and vigorous, the chances are in his favor of not being sterile. If, however, he is effeminate, has a falsetto voice, small, undeveloped penis and absence of hair on the pubes, the condition being bilateral, the testicles having been the seat of repeated attacks of orchitis, the probabilities are that the patient is incapable of procreation. Provided the testicle was healthy, even if somewhat atrophied, it has been our custom to save it whenever it was possible to do so. On more than one occasion we have been gratified to find that after the transplantation an atrophied testicle has developed into almost its normal size when placed in its normal position. Many cases are on record in which men with undescended testicles have married and succeeded in impregnating their wives. For this reason the individual should always have the benefit of the doubt; the sexual glands should not be sacrificed, if possible; moreover, it is well known that the loss of one or both of the glands is frequently conducive to great mental depression and even melancholia.

Clinical experience has taught that resection of the epididymis and vas deferens in cases of diseased condition of those organs, the testicle retains its normal size, sexual vigor is unimpaired, the mentality of the patient remaining undisturbed. This observation places the testicle among the ductless glands. It would appear that one of the functions of the testicle is to elaborate a secretion, the absorption of which is of vital importance to the preserving of the normal condition of the nervous system. If this theory be true, the organ should never be sacrificed if there be a chance of its being preserved. In one instance, after freeing the adhesions of an undescended testicle, it was found that on placing the organ in the scrotum the tension on the cord was very great. In order to relieve this condition the method suggested by Mr. Wood was adopted. The globus major was dissected free from the testicle, far enough down to permit of the organ being inverted. By this means one and a half inches in length was gained. After a testicle had been transplanted, not only was it fastened by means of a suture to the bottom of the scrotum, but the cord was stitched to the pillars of the ring.

Eleven cases were treated by what may be denominated the "palliative operation"; they were of long standing with large hernias, enormous hernial outlets, and atrophied muscular abdominal walls. Eight were indirect, and three were direct inguinal hernias. Two had been incarcerated for a long time; three were partially so, and three were reducible; but the individuals were unable to retain the mass by any form of apparatus that was employed. Four were of large size, the remainder being of the dimensions of the average hernia. These individuals were annoyed by flatulence, eructations, constipation, occasional nausea and colicky pains. In each instance the individuals were incapacitated for work, so that they necessarily became involuntary idlers and habitues of the Out Wards of the Philadelphia Hospital. In none of these cases was it presumed that the operation would result in a permanent cure. It was undertaken simply in order to relieve the symptoms and in hopes that after convalescence the individuals would be enabled to retain the intestinal protrusion by means of a properly applied truss. In each instance the result justified what might be regarded as an experimental operation; all were much improved and all were enabled to retain the bowels by means of a suitable apparatus.

In cases of this description the surgeon cannot follow the fixed rules laid down for any recognized operation; he must utilize his experience and judgment with such available resources as he may have at command. In two cases in which the rings were large and the conjoined tendon weak or absent, the Bloodgood method was adopted. For the closure of enormous hernial outlets with large protrusion associated with an atrophied condition of the muscular structure, cases hitherto considered as inoperative, Witzel suggested the closure of these large apertures by means of buried silver netting (*Cent. f. Chir.*, March 10, 1900).

In spite of the apparently favorable results obtained in the few reported cases, we cannot help feeling skeptical as to the value of the procedure and are inclined to believe that a more extended experience with this method of attempting to close large hernial outlets will prove unsatisfactory. As has already been pointed out, the employment of the buried silver suture, from the use of which so much was expected when first introduced to the notice of the profession, has not come up to the expectations and has in consequence been abandoned by the majority of surgeons. We can see no reason why, therefore, the employment of silver netting, filagree or allied devices should not meet with a similar fate. Nevertheless this method of attempting to relieve what was hitherto supposed to be an inoperative condition is still on trial. It certainly merits the careful study and serious consideration of the profession. The gratifying results obtained in the few cases that have been reported are most encouraging, and it is hoped that a more extended experience with this mode of treating cases of the kind will result in demonstrating that a large number of these unfortunate sufferers who are now condemned to a life of pain and misery may be capable of being relieved.

In each case of the kind operated upon by us a different method was employed. In our judgment, in selected cases of long standing incarcerated hernias and those that are reducible, but cannot be retained by the employment of a truss, the chance of relief should be attempted and comfort afforded by a palliative operation. Not with the hope of making a permanent cure, but to relieve the distressing symptoms which naturally accompany such a condition, an effort should be made to retain the rupture by means of a suitable apparatus. We are convinced that too many surgeons give too little attention to the selection of a suitable truss for nonoperative cases. As a rule, the patient is sent to a truss maker, who applies the variety of instrument that in his judgment is best suited for the case. It is true that the average truss sold by instrument makers will usually serve to retain the ordinary hernias. Occasionally the truss does not hold the protrusion in place, when the patient is told that it is impossible to retain the rupture by means of an apparatus. A careful study of the cause which prevents the truss from being satisfactory, together with the anatomical peculiarities which exist in each instance, will result, in the earlier stages of reducible hernias, in keeping them satisfactorily in place by the use of a suitable device.

It is generally conceded that age makes but little difference in the mortality when operating on strangulated hernias, provided the constriction is relieved without using taxis inordinately before resorting to operation. The extremes of life seem to bear the operation well.

Regarding the age when a radical operation can be performed for the relief of hernia with the greatest certainty of a favorable result, the views advanced by Coley have been generally accepted in this country, the most favorable period being about the sixth year. In the adult, without good cause, it is not well to attempt a radical cure after sixty, and not then in very large and incarcerated hernias.

Coley teaches that if, after an operation, a recurrence is liable to take place, it usually does so within six months, and that if the patient remains in a healthful condition for one year it is usually safe to predict that recurrence will not take place. In three cases we have had a recurrence after two years. We believe in the main that Coley's views are correct.

There is a certain class of patients subject to hernia who are unfit for a radical or palliative operation unless the protrusion becomes strangulated, when the danger is greatly increased; but, of course, the individual must be allowed to take his chances. Unsuitable cases for either a radical or a palliative operation are the obese, in whom the abdominal wall bulges far forward; persons who suffer from any disease of the viscera, and those who have an incarcerated hernia of enormous size and long standing. Those who necessarily wear a truss after an operation are individuals who suffer from a direct inguinal hernia; those in whom an infection of the wound has taken place after an operation; all operations which might be classed under the head of palliative; in hernias of long standing; in individuals who have to earn their livelihood by hard labor; in emergency herniotomy where the patient's condition would not warrant the employment of the length of time required to do a radical operation, and in children in whom it was found that the hernial ring was unusually large. According to Eccles, those who have a poorly developed muscular abdominal wall and a family history of tendency to hernia should always wear a properly fitting truss after undergoing an operation.

From a study of the cases recited in this paper, the following conclusions seem to be warranted:

(1) The safety of the patient as well as the lowering of the mortality in strangulated hernia depends on gentle taxis being exerted for a short period, which, if unsuccessful, should be succeeded by an immediate operation.

(2) Herniotomy for the relief of strangulated hernia in the aged is not a dangerous operation, provided it is performed as soon after the constriction has taken place as possible.

(3) An inflamed hernia should not be treated by taxis, but should be subjected to an operation.

(4) No one method of attempted radical cure is applicable to

every variety of rupture. The Bassini is suitable to the largest majority. The Bloodgood for those in whom a large abdominal ring and weak or atrophied conjoined tendon exist. The relief of special forms and conditions of hernia must be met by the ingenuity of the surgeon, selecting the operation to the indications presented.

(5) The palliative operation is applicable to a large number of selected cases of reducible hernia, when the protrusion cannot be kept within the abdominal cavity by means of a truss, and also in some forms of incarcerated hernia.

(6) A radical cure may be safely attempted on patients who have reached their sixth year and on those who have arrived at their sixtieth year.

(7) Individuals who submit to what is known as the "palliative operation" should continue to wear trusses after recovery.

(8) In cases not applicable to a routine method of operation the surgeon should strive to do what in his judgment would be the best means of effecting the removal of the entire neck of the sac on a level with the parietal peritoneum. He should, if possible, firmly close the opening in the peritoneum after the removal of the sac; he should obliterate the depression of the peritoneum in the vicinity of the internal abdominal ring, bring in apposition the structures, and close the apertures which form the canal through which the rupture protrudes.

(9) An aseptic result following a radical operation with primary union, is essential to obtain a permanent cure of hernia.

(10) In cases of undescended testicle associated with hernia every effort should be made to save and transplant the organ.

(11) The method of operating for umbilical hernia suggested by Mayo is probably the most satisfactory for that variety hitherto suggested.

(12) Absorbable sutures are preferable to those of nonabsorbable material.

DISCUSSION.

DR. MORDECAI PRICE: There ought not to be 24 minutes' delay after the diagnosis of strangulated hernia is made, simply long enough to get ready for the operation, and if the slightest taxis will not then reduce the hernia the operation should be done immediately. My custom is to have the patient etherized without any taxis whatever. This, for 2 reasons: (1) I believe operation is safer than taxis; (2) you then have an opportunity of and a good excuse for curing the patient. I believe the mortality is almost nothing, provided the operation is done immediately. I think an attempt to purge a patient after an operation for strangulated hernia is apt to set the patient to vomiting. Magnesium sulphate injected into the bowel is a better means of accomplishing the result than administering cathartics by the mouth.

DR. JOHN B. DEAVER: I have often thought that it would be safer if teachers of surgery would not teach taxis. I am sure much harm comes from attempting to make taxis. I believe it is safer in the event of suspected strangulation to resort to operation immediately, particularly with a mortality of 0.5%. I have often thought that it would be justifiable for surgeons to urge operation in all cases in which there were no constitutional contraindications, instead of advising the patient to wear a truss. I have so much confidence in the operation for the radical cure of hernia and so little confidence in the truss as guarding against strangulation that I believe operation is the safer course to pursue. We must take into consideraion the fact that some men would not be capable of performing the operation; yet, if we review all the arguments pro and con I think more are in favor of operation than against it, and more against taxis than in favor of it.

DR. G. G. DAVIS: There is one practical point that might be noted—the insidiousness of strangulated hernia in old people. When hernia becomes strangulated in old people the affection seems to progress without any marked reaction. There is little pain and often but slight constitutional disturbance. This may go on for days and the attendant may think there is no trouble occurring, when the vomiting persisting, a consultation is called and at operation the gut is found to be gangrenous. I have seen this on several occasions. I think the judgment of the profession is that there is but one operation, and that is the Bassini. The principal modification introduced by Dr. Halsted I believe, is the transplanting of the cord to the outer angle of the wound, passing it directly through both layers of muscle and sometimes resecting the veins. Of course, they are not resected when they are not enlarged. In thus transplanting the cord he brings it directly through the abdominal wall at the outer angle of the wound and then down under the skin and superficial fascia, over the external oblique. In a considerable number of cases I adopted the opposite method and transplanted the cord to the inner angle of the wound and closed both the external and the internal abdominal rings, and then brought the cord out through the external ring, instead of, as Halsted does, out through the internal ring. This was because it had been noticed that recurrence of hernia was most common at the outer angle of the wound, and I thought if the cord were transplanted at the inner angle we would not have any recurrence. After doing many of these internal transplantations a patient had a recurrence, and inasmuch as I had not had that with the Bassini, I have discontinued the internal transplantation and returned to the Bassini. I would like to ask Dr. Horwitz whether in doing the Bassini operation he considers it desirable to place a suture at the outer side of the cord, in order to prevent the muscles from separating and a hernia forming at that point. If this is thought to be a desirable procedure I think the following method is probably preferable: After the sac has been ligated, introduce a rather blunt needle through the external oblique and internal oblique muscles above the line of the incision in the direction of the anterior superior spine, bring it out of the incision, and thread one end of the ligature and withdraw it. Do the same with the other end and tie these 2 ends about an inch above the incision. When you do that, you practically place a ligature to the outer side of the incision so as to prevent any splitting of the wound, and at the same time bring the neck of the sac away from the internal ring. There is another procedure, suggested, I think, by Andrews of Chicago. It is the overlapping of the external oblique. Bassini brings the two edges of the external oblique together and sews them from the internal ring down to the external ring. Andrews' idea, as I understand it, is to overlap those edges in the same manner as Mayo has done with umbilical hernia. In attempting this procedure I think in some cases the amount of tissue at our disposal will be too slight to allow any great overlapping of the external oblique. In Bassini's method by the time a moderately fair amount of tissue is included on each side of the incision in the line of sutures of the external oblique, there will be practically no surplus tissue left.

DR. L. J. HAMMOND: I would like to ask Dr. Horwitz what experience he has had with the operative method for the radical cure of inguinal hernia suggested some years ago by Ombredane and Nélaton. This consists in an orchidopaxy, a procedure by which the cord is first exposed, and having been stripped of connective tissue down to its principal vessels, is dropped into an opening the size of a centime made in the spine of the pubes. The entire inguinal canal is then obliterated by suturing each anatomical layer separately. This method I have employed in 4 cases with uniformly good results, no recurrence having as yet taken place. It seems to be a method that is applicable in old persons in whom there is marked attenuation of the abdominal muscles and in whom almost any other operative procedure would probably fail. It is not, I take it, the best procedure when the abdominal muscles are capable of supporting the intraabdominal contents when brought together. In such a case the Bassini is the operation to employ.

DR. HORWITZ: In cases of strangulated hernia gentle taxis should not be continued for over 10 minutes; should this fail preparation should be made for operation, the patient etherized and taxis again attempted, which, if unsuccessful, should be followed by incision. I do not advocate large doses of calomel unless the bowels are uninjured; in cases of simple paralysis of the bowel with probably beginning peritonitis. Regarding the question of Dr. Davis in reference to the advisability of inserting a suture above the cord, I have resorted to it in several instances, in which I thought it was indicated and found it very satisfactory. I have employed the operation of Nélaton and Ombredane, referred to by Dr. Hammond, in one case and found it very satisfactory. I do not believe that any set operation will be applicable to every form of inguinal protrusion. The Bassini is suitable for the majority of cases, but instances arise in which the surgeon must deviate from the beaten path and adopt such measures as his experience and judgment lead him to believe will be most conducive to a successful result.

Acute Appendicitis.

By LEON BRINKMANN, M.D.

[Read January 27.]

I desire to present to you this evening the subject of acute appendicitis in a form that will appeal more directly to the general practitioner. Although much has been written upon this subject, the last word is far from having been said. Anything which may tend to throw additional light upon the early recognition of acute appendicitis will, in the end, tend to lessen the mortality. To produce this reduction in the mortality we all agree that early operation is the surest means of avoiding complications, and by instituting prompt surgical interference in the early hours of the attack the mortality of the disease would be reduced to the minimum, which should be about 1 per cent. instead of from 4 to 20 per cent. in the acute cases.

The responsibility of failure to resort to early surgical interference in acute appendicitis may be classified as due to: (1) The patient's neglect in failing to send for a physician early enough in the disease.
(2) The physician's inability to recognize the disease at the first visit.
(3) The patient's or physician's repugnance to surgical measures.
(4) The hope that something may turn up to produce recovery.

(1) If the responsibility is due to the patient's failure to secure proper medical attendance at the onset of an acute attack of appendicitis, and there is a further delay in the treatment by procrastination, this class of cases will form a nucleus for a mortality which cannot be eliminated.

There is a very considerable class of cases of acute appendicitis which demands instant surgical interference directly after the onset of the disease, owing to the severe type of the infection, to early perforation or to gangrene, and in which the patient's only hope for a prompt recovery is by immediate operation, within the first ten or twelve hours after the onset.

(2) The physician's inability to recognize the disease at the first visit. That this state of affairs is a possibility after such an exhaustive discussion of the subject has been before the medical world for the past decade, seems almost incredible. I will admit in very exceptional instances there may be a case in which the diagnosis is in doubt. There should not, however, in the average case of appendicitis be any hesitancy or doubt expressed in making the diagnosis after a careful examination of the individual. Failure should be ascribed to ignorance or to neglect; in either instance it is inexcusable.

(3) The patient's or physician's repugnance to surgical measures. Undoubtedly there is a certain percentage of people who would under no circumstance permit the performance of a surgical operation upon their persons. This class we cannot consider in the mortality of the disease. There is, however, a much larger percentage who will not permit surgical measures to be adopted until it meets with their preference, or who will permit it as a last resource, notwithstanding the advice of the medical attendant. The latter class of patients should be dealt with in a manner in which they deserve, as no conscientious medical practitioner ought to permit his patients to dictate to him what they believe to be the proper course to pursue. The physician would better sever all connection with such a case, thereby avoiding the unnecessary responsibility which he would otherwise ultimately have to shoulder if the case terminated fatally. While it is the duty of the surgeon to alleviate suffering and distress, and to restore the sick to usefulness, I would not, under such circumstances, blame him were he to refuse operation as a last resort. Operation done upon patients with one foot in the grave with the hope of pulling the other foot out, is most usually the means of adding an additional and unnecessary mortality and stigma to surgery, more especially in those instances in which the patient's dissent was the factor in the delay.

In speaking of the physician's repugnance to surgical interference I can in no other way account for the many deplorable cases which are referred for operation to the surgeon *in extremis*, sent by those misguided doctors who do not believe in the propriety of operation at any stage; by those who believe in waiting until the case is ripe, a huge abscess, or until a second or more attack, or lastly, trusting in the hope that the case will subside and permit an interval operation which is attended by no risk, providing the patient survives the attack.

That appendicitis has been determined a surgical affection is the consensus of opinion among medical leaders throughout this country, and yet the disease is treated medically. Why? The answer resolves itself into a lack of confidence in the ability to diagnose the disease properly, to a lack of assurance as to the ultimate effect of surgery, or to a repugnance for surgical intervention. Which is it?

The spirit of antagonism displayed to surgical interference in acute appendicitis by the medical practitioner is inexplicable in many instances in the face of the patient's apparent condition. When we consider the extraordinary statement made by some, that they have never lost a case of acute appendicitis, and have never had even one of them operated upon, it would seem as if they certainly had

had a most remarkable sequence of cases, if they were appendicitis. A second class of physicians depend upon the chances the patient has to get well without operation, not counting upon the balance of the chances against the patient by the delay. In a case recently seen by the writer, the physician took the stand that the patient had seventy-five chances to get well without operation, although he stated he would have passed several very anxious days until convalescence would have been assured. When pressed for an opinion as to the patient's chances by immediate operation, he thought that they were from 99½ to 100 to get well. It would seem that the physician was willing to assume a risk for the patient of one out of four chances merely for the sake of avoiding an operation.

Operation revealed an acutely inflamed appendix with gangrenous involvement of its mucous and submucous coats and the organ filled with foul-smelling pus. The appendix was removed through a small incision; drainage was unnecessary; recovery uneventful. This is a single illustration of a large group of cases which under the ordinary or usual medical procrastination would have terminated fatally from a so-called fulminating appendicitis, as kind nature, the saviour of so many cases, had failed to protect the peritoneal cavity by lymph or adhesions.

There are but few cases of acute appendicitis too ill to contraindicate the operation, unless absolutely moribund. I am satisfied that in the past I have refused to operate on cases in which there were present symptoms of advanced general peritonitis. During the past year I have operated upon fifteen such cases, and am happy to state that ten recovered. One of these was a child that had been ill for two weeks, was much distended, suffered excruciating pain, with a temperature of 104° F. and a pulse of 160. Local anesthesia was employed, the purulent fluid in the peritoneal cavity evacuated, and drainage introduced. This child survived the operation but six hours, notwithstanding the fact that the simplest treatment was resorted to. In the remaining fourteen cases there were all the evidences of general peritonitis, although I could not positively affirm that every square inch of the peritoneum was infected.

(4) The hope that something may turn up. It has been said that hope and faith are the foundations of religion. We must not, however, employ our hope and faith in direct violation to conviction. It is a fact that a great many cases of catarrhal appendicitis are not of sufficient gravity to warrant the patient in sending for his medical attendant owing to the transient character of the pain. That a fairly large percentage of cases of acute appendicitis do not stop at the catarrhal stage is attested by the increasing statistics of operations;

the many cases of circumscribed abscess, perforation, gangrene of the appendix, general peritonitis, lymphatic infection, and of the remote consequences of the disease, all form too vivid a picture to allow hope to sway our judgment against operation while waiting for something to turn up, which may, at best, defer the inevitable. The best thing that could happen would be an intelligent physician who would point out the urgent necessity for intervention and thus bring about a cure, and with it the conviction that this is the best means to adopt.

The remarkable unanimity of surgeons who are familiar with the subject of acute appendicitis in declaring that early operation is the only means whereby a reduction in the mortality may be accomplished, makes it all the more important to familiarize ourselves with the early characteristics of the disease and its progressive phenomena.

The apparent unfamiliarity of the average physician with the early symptoms of acute appendicitis and with the changes of the symptoms as the disease progresses accounts, in a great measure, for the inability to make a diagnosis. Every physician is, or should be, familiar with the cardinal symptoms of the disease, viz., pain, tenderness and rigidity. The pain, tenderness and rigidity, varying in location according to the stage of the disease, the position which the inflamed appendix holds and the personal idiosyncrasy of the individual to the effects of sepsis are the determining factors in arriving at a diagnosis after excluding any other abdominal condition with which it may be confounded.

The pain in acute appendicitis is not confined to any fixed point within the abdominal cavity; while it is true that in the majority of cases it is located in the right iliac fossa late in the disease, the early pain in acute appendicitis will be found in the epigastric, umbilical, suprapubic, left iliac, hepatic or right lumbar regions.

The nature of the pain at the onset is usually of a colicky character, and the patient complains of cramps. These cramp-like pains are paroxysmal and intermittent, increasing in severity with shorter intervals between the seizures, and maybe attended with either nausea or vomiting or with both; they are, however, not constantly present.

The onset of an abscess is marked by a very material increase in the pain located at and confined to the immediate vicinity of the abscess. A sudden cessation of pain is indicative of perforation or a rupture of the appendix, particularly if associated with sudden depression.

A decrease in the amount of pain and a persistence of the rigidity means that gangrene has set in.

When there is diffused pain late in the attack and a commencing rigidity of the abdominal walls (stiffness) it marks the advent of a commencing general peritonitis.

The tenderness in acute appendicitis varies in degree quite as much as does the pain. In the very early hours of the affection the tenderness is not so marked, and might be overlooked by one not familiar with the quality and quantity present at this time. If, however, the tenderness is associated with the pain and other phenomena of the disease at this particular stage, slight rigidity and nausea or vomiting, one can scarcely be mistaken. As the time passes and if the disease is progressive, then the tenderness becomes more marked, increasing each hour; located as it is over the site of the appendix, it makes it more possible to locate the organ by the sense of touch. In cases with fecal concretions or foreign bodies and in the presence of localized abscess, the tenderness is most marked, the patient wincing at the slightest pressure and drawing away if much force is brought to bear over this region. When the appendix is situated in the pelvis, then we may expect to find the tenderness in the left iliac or suprapubic region. If the tenderness is in the umbilical zone the appendix is either behind the mesentery or points upward toward the gall-bladder. If the base of the appendix is involved, then we may in all instances find the tenderness in the right iliac fossa.

The amount of rigidity, like the tenderness, varies according to the stage of the disease and the intensity of the inflammation within. At the onset of an attack of acute appendicitis the rigidity is very slight and can only be elicited by the slightest pressure made with the finger tips over the portion of the abdomen in which the appendix is located. If, however, the appendix is situated in the pelvis the rigidity will be most marked over the lower portion of the left rectus muscle. The fact that the rigidity is often overlooked is easily explained by the method employed in the endeavor to find it, too much force being exerted in the effort. As the disease progresses, the rigidity becomes more marked and more easily defined. I quite recently saw a young woman about one hour after the onset of the attack, and discovered upon palpation of the abdomen a most marked rigidity over the entire right iliac region which was progressive. I was unable, for reasons over which I had no control, to secure operation until eighteen hours had elapsed, and found a completely gangrenous organ present.

We cannot place too much reliance upon what might be called surface indications to determine how severe an attack of appendicitis will ensue. One individual will present all the phenomena of a most severe type of infection with excessive pain, tenderness, rigidity, nausea and vomiting, with high temperature and rapid pulse, and yet an operation will reveal a small engorged appendix without any periappendiceal inflammation and without pus. This has been ascribed to the personal idiosyncrasy of the individual to sepsis. I believe, however, that it is due to some particular type of infection—either the coli communis or the streptococcus, or a combination of both—in which the operation has anticipated an extraappendiceal invasion.

In other instances individuals will have a progressive appendicitis with destructive changes going on without any particular grave or alarming symptoms appearing until late in the disease. On more than one occasion I have seen patients walking about, experiencing but slight discomfort, in whom I have found quite a large circumscribed abscess.

The danger in appendicitis is not alone from the formation of an abscess, but also from the plastic material thrown out by nature to protect the peritoneal cavity from infection. Upon the evacuation of a pus collection the plastic material forming a part of the abscess wall contracts in the process of obliteration of the cavity, and herein lies the danger, for an acute internal intestinal obstruction is liable to occur if the bowel is included in the abscess wall, and I might say that this is the usual state of affairs. Therefore, the danger of acute obstruction is ever present in all cases of circumscribed abscess. Further comment is unnecessary in reference to this complication other than to remark that early interference, before a collection is permitted to develop, would obviate this danger.

The inability to tell with any certainty how far the disease has progressed or that the patient will recover from an attack of appendicitis is beyond human skill, and is dealing with the disease and patient in a hazardous manner. There are some physicians and some surgeons as well who delude themselves with the idea that they possess this power. These men in a large measure must face the responsibility for the continued high mortality in the disease, because, by their acts as well as by their influence on other physicians, they allow a certain latitude to those who are always seeking some justification for deferring operation until it is either too late or is attended with great danger to the patient. When a conflagration is in progress the owner of the property undergoing destruction would certainly and properly lay the blame upon those whose duty it was to secure the means of extinguishing the fire, which in the course of a short time would consume his goods, if they failed to procure such means.

We can replace goods lost by fire, but we cannot restore a life consumed in an appendiceal conflagration, and it is just what will occur in a certain proportion of cases if the physician or surgeon will presume to guess just how far or how much the fire of an appendiceal volcano will consume. It has been the experience of many of us whose patients were apparently recovering from an attack of appendicitis, to be much chagrined by a rekindling of the inflammatory process, which was succeeded by a general peritonitis from a perforation of the appendix, the case ending in death; all of which might have been avoided by early operation. This is one of the dangers of waiting for the interval operation, which sometimes never comes.

There is no doubt in my mind that the so-called cases of fulminating appendicitis are those which have had previous attacks which were unrecognized, and in which there remained a nidus of the primary attack only awaiting a favorable opportunity to rekindle. The number of cases operated upon in the interval between attacks has led to a more careful research as to the determination of the cause of the fulminant type, with the result that a fairly large number of cases have demonstrated either the presence of pus in varying quantities in the cavity of the organ, the presence of a cystic and strictured organ, or the occurrence of fecal concretions imbedded in the organ with an eroded and ulcerated mucous lining and one or more spots of pressure necrosis, leaving the peritoneal coat as the only barrier between the contents of the appendix and the peritoneal cavity.

The diagnosis of appendicitis is, as I have before stated, an easy one to make with but few exceptions, and the border-line cases, if they may be so styled, are of such a character as to require abdominal section quite as urgently. When we consider that appendicitis is the most common acute intraabdominal disease, and when brought in contact with any acute abdominal colic we should bear appendicitis in mind as the first possibility until other conditions with which it may be confounded are excluded, the diagnosis will be greatly simplified.

I have found from experience that there are but few conditions in the male which will so closely simulate acute appendicitis as to require consideration in arriving at the diagnosis; these are acute inflammation of the gall bladder and its ducts, pancreatitis, stone in the kidney or ureter, hernia, intestinal obstruction. The various pelvic conditions resulting from inflammation of the Fallopian tubes and ectopic pregnancy in the female.

There is a sequence of symptoms in acute appendicitis which is not found in the other diseases enumerated above. The pain, tenderness and rigidity are not so marked, and if we will note the difference in the progressive phenomena, as I have tried to make clear in the early portion of this paper, I cannot conceive how one could fail to make the diagnosis.

I wish to draw attention to two facts in making a differential diagnosis, which are not generally brought out in the discussion of this subject. One is the cause for the slight pain experienced by some, notwithstanding the fact that an abscess is present. When the inflammatory process includes the parietal peritoneum there is always a greater amount of pain, and also increased rigidity; if the disease is deep within the abdominal cavity and surrounded by coils of intestines, the pain and rigidity are not so marked.

The only purely medical condition with which appendicitis may be confounded is the onset of a pneumonia. I have found in quite a few instances, when called in consultation in cases of supposed appendicitis, a beginning pneumonia with acute paroxysmal pain in the right iliac fossa, which, however, was not associated with the other phenomena of appendicitis. Examination of the chest revealed the early phenomena of pneumonia. This is particularly of importance in children, in whom I have found this condition four times.

In discussing the treatment of appendicitis I will not waste time in describing methods with which all of us are more or less familiar, nor speak of medical means of combating the disease, except to remark that this is a surgical affection and requires surgical measures to ensure complete relief.

I do not believe that any case of acute appendicitis should be refused operation unless actually moribund. As I have previously stated in this paper, I have operated upon fifteen cases which were *in extremis*, ten of which recovered. All of these cases presented unmistakable evidences of general peritonitis; one was so clearly moribund that the anesthetizer expected a fatal result from the administration of the anesthetic. The best result that I expected in this instance was a prolongation of life. There was a gangrenous appendix separated from the cecum at its base, pus and fecal matter in the peritoneal cavity, and yet this patient recovered after a three months' convalescence.

In conclusion, I wish to enter a pronounced protest against the Ochsner treatment of appendicitis; the plan of the starvation treatment without the intervention by surgical measures until late in the disease violates the basic principles of good surgery. When we are confronted by the products of inflammation and bacterial action, it is evident that until these are disposed of by operation, resolution will not take place. If delay is resorted to, experience shows that there is always an increase in the amount of purulent material, that the area of tissue involvement will be increased, that the inflammatory changes in the contiguous structures will be proportionally greater, that the organization of the adhesions will be firmer and the disposal thereof will greatly endanger the structures involved.

When we consider, further, that patients live for a period varying from three or four days to one or two weeks after a more or less circumscribed peritonitis has developed, and then die either from the shock of a late operation or from neglect to operate, it is self-evident that had surgical interference been adopted instead of trying speculative measures one would have nothing with which to reproach himself.

One of Ochsner's main points in advocacy of the starvation plan is the prevention of peristalsis, thus avoiding a further contamination of the peritoneal cavity. If we will pause for a moment and carefully review the other possible means of spreading the infection within the peritoneal cavity, one of the strongest points in the treatment falls flat. The action of the diaphragm in the act of respiration, inspiration or expiration has a greater or less tendency to syphon action on the contents of the abdominal cavity, which is clearly noted in the performance of any abdominal operation, hence there will be bowel movement without peristalsis. The peritoneal cavity contains a quantity of fluid which in the acute infective process of a peritonitis offers the very best culture-medium for the growth of microorganisms, and as the contents of the abdominal cavity are bathed in this fluid and each act of respiration displaces it to some extent, it will be readily seen how this is an additional factor in the spread of the infection. The remaining method of infection is through continuity and contiguity of tissue. We cannot limit the migration of the bacteria or the invasion of the germ by inhibition of peristalsis.

Dr. Ochsner further states that large enemata should never be given, fearing rupture of an abscess or a circumscribed collection. This, to my mind, is a clearly defined proposition for operation instead of delay. He further states that when neither food nor medicine has been administered from the onset of the disease, his mortality has been *nil* in acute cases. I must say that I have as yet to see the case of appendicitis which has not had some household remedy administered prior to the visit of the medical attendant, or even after treatment had been instituted by the physician in attendance. Those cases which would recover by physiological rest may be classed among those which it is the lot of the ordinary surgeon never to see. He further states that by the abstention from food and lavage operation is made easier for the surgeon. I fail to see whereby this abstention will in any manner facilitate operation or help the operator. I certainly have never found sufficient peristaltic movement of the bowels to be appreciable in any degree whatsoever, nor any fecal accumulation in the cecum to embarrass the operation.

I do not for one moment want it understood from my remarks that Dr. Ochsner does not favor early operation. He does, but he places a time limit, after which operation shall be deferred until all acute inflammatory action has subsided.

DISCUSSION.

DR. JOHN B. DEAVER: That the patient's neglect to send for a physician early enough in the attack is responsible for a certain percentage of the mortality in appendicitis there is no question. The patient believing and believed to have an ordinary stomachache is given home remedies until the disease is advanced to such an extent that even when the family physician is called in, it is too late for a good operative result. That the so-called cholera mixtures, paregoric, and remedies of this sort are in many instances responsible in misleading the patient and friends with the belief that the pain is only temporary, there is no question. The doubtful cases, in which the physician is unable to recognize the disease at the first visit, are those in which the differentiation must be made between a terminal infection of an appendix pointing upward, which results in an explosive attack; acute phlegmonous cholecystitis; perforated gastric or duodenal ulcer of some hours' duration; acute pancreatitis; movable kidney temporarily anchored, particularly if occurring in the midst of an attack of acute indigestion; an ovarian cyst twisted upon its pedicle; or a possible ruptured extrauterine pregnancy and perforation in typhoid fever. If dogmatic teaching is permissible, certainly it is in the treatment of acute abdominal affections. I cannot argue concerning the repugnance of the patient or the physician to surgical measures from the standpoint of my experience, because I have more trouble to keep people from having operations done than I do to persuade them to have them done. It is my experience that if a frank, open, truthful statement of the case is presented to the patient, the chances with and without operation, and with a statement that "you should be governed by the advice of your doctor," operation is always agreed to. Operations as a last resort, done in the presence of all the evidences of approaching dissolution, which I have repeatedly seen done after a consultation and difference of opinion as to its advisability, in my opinion are not only harmful to the patient, but also to the cause. The physician's repugnance to surgical interference is due to misplaced confidence in medicines; to not having had an opportunity of studying the antemortem pathology of the disease, the study of the disease in the living subject, as is given to the surgeon, and in the teaching of the starvation treatment of appendicitis. "The fact that a great many cases of catarrhal appendicitis are not of sufficient gravity to warrant the patient," etc. I take exception to the term catarrhal appendicitis and beg to substitute the term infectious appendicitis. We must admit that all cases of appendicitis are infectious; whether the inflammation is confined to the epithelial surface of the mucous membrane or the deeper structures is of no special moment. It holds the same relation to the patient as a septic wound, the latter being traumatic, while the former is pathological, and the treatment should be the same, namely, to lay open the tissue at the seat of infection and liberate the infected tissue when the subsequent progress of the patient is more likely to result favorably than otherwise. In many instances the patient himself makes the diagnosis by the statement that deep breathing hurts at a certain point and that the attempt to cough produces the same result, which certain point corresponds to the site of the infected appendix. The little patient, upon seeing the doctor approach the bedside, will say to its mother, "Don't let the doctor touch my side." Examination must be made gently. Many a doctor of large practice and experience never learns palpation. The light hand, which means a delicate sense of touch, will detect a slight rigidity, while the heavy hand will overlook it. In the examination of the abdomen it is a mistake to commence the investigation at the supposed site of disease; the examination of the parts of the abdomen which are free from pain should first be made. I must lay stress upon the importance of a carefully elicited history; that much depends upon the latter in obscure abdominal cases there is no doubt. The diagnosis of appendicitis is more easily made early in the course of the disease than later. The patient never recovers in the sense that the appendix again becomes normal and, therefore, may at any time be the source of further disturbance, the outcome of which is always problematical. To hope for abscess formation, so common an occurrence, but which may not occur in the shape of a walled-off collection which can be opened extraperitoneally or that will be evacuated subsequently by rupture into the cecum or other hollow viscus, is very uncertain. In concluding my remarks in favor of operation as against other forms of treatment, I beg to say that in my last year's work, ending September 1, 1903, I operated on 194 acute cases of appendicitis with 1.5 per cent. mortality and 173 cases of chronic appendicitis with no mortality. Taking the 194 acute cases with 1.5 per cent. mortality and the 173 chronic cases with no mortality, gives us 376 cases with 0.8 per cent mortality.

DR. MORDECAI PRICE: I am thoroughly convinced that Dr. Brinkmann's statements are facts, but the surgeons, in my judgment, the men who are operating for appendicitis, are more to blame for delays than the practitioner. The practitioner today makes his diagnosis with more assurance and positive assertion than the surgeon, and, when the surgeon comes to his assistance and takes ground with him and questions the possibility of diagnosis he must do it under the very gravest conditions. I have never yet operated and regretted it, but I have thrice refused to operate when I did not fully concur in the diagnosis, and 2 out of the 3 patients died of appendicitis. I am convinced that the surgeon who says he will operate the next day is the man who is culpable of delay. When he has made up his mind that he is dealing with appendicitis it is his business to operate at once. I believe nine tenths of our delayed cases would be found gangrenous if operated upon earlier. I am convinced that our delays only increase the suffering of our patients both before and after operation. I feel that Ochsner has done more harm, although one of the best surgeons in the United States, than any other man in America, by his advice to wait. I do not believe that a patient who has had a large abscess in the peritoneal cavity ever entirely recovers. With a peritoneum full of foul pus, the ileum covered with inflammatory lymph, I am as sure that water will save 99 out of 100, and nothing but water; peroxide of hydrogen would kill any one. If the bowels are plastered together, the patient, if necessary, should be eviscerated and every single collection of pus washed out. In order to do an operation properly the abdomen should be opened; the appendix should be removed at any cost; the entire peritoneal cavity should be washed out and drained with gauze, rubber or glass; anything less will do harm. When the appendix and the head of the colon are gangrenous all the diseased tissue should be removed and the bowel folded in, commencing as near as possible to the diseased area, where a stitch will hold in the healthy bowel

DR. A. E. ROUSSEL: I am glad to hear that suppurating cases of appendicitis are probably those that have had a previous attack. It is rather difficult to imagine that pus can be developed within 24 hours. I cannot agree that the diagnosis of appendicitis is always such an easy matter as it is in the majority of instances. Within the past 2 months I saw a case in consultation with Dr. McMillan in which examination showed evidence of plastic pleurisy. Twenty-four hours later abdominal pain developed, at first general; on the second day referred to the right side, and on the third day to the left side. Operation was done with perfectly successful results, but the incision was made on the right side. Given a case of this kind, with fever and with plastic pleurisy, the diagnosis is by no means a simple affair.

DR. G. G. DAVIS: I think that if the cases were always as clear as the majority of those we have heard detailed this evening, the question of operation would be one easily settled, because I think the whole profession is in favor of early operation, provided the case is a clear case of appendicitis. I believe in operating early, and do not hesitate to do so. The profession has been for years urged to operate to such an extent that the practicing physicians have taken their cue and no longer ask if operation ought to be done, but say "I have a case for operation." This brings us face to face with the question of diagnosis. Appendicitis has some pathognomonic signs when it is advanced; but I have no doubt every member of this Society time and time again has diagnosed what he unhesitatingly believed to be appendicitis, yet which he would not think for a moment of subjecting to an operation. Suppose a patient were to have one single sign of appendicitis, pain at McBurney's point, I believe a large number would say he had appendicitis, yet they would hardly recommend operation on that sign alone. Suppose he has pain, tenderness and rigidity, the 3 symptoms which have been mentioned here as diagnostic; is the case one of appendicitis? It may be or it may not be. Any one who has his attention directed to this part of the body for any length of time will see, as I have seen, gall bladder disease, enterocolitis, typhoid fever and other affections mistaken for it. Cases of disease of the right tube or ovary may be mistaken for it. I am not speaking of the marked cases in which you have pain, rigidity, tenderness, temperaturre, retraction of the psoas muscle and a mass in the right iliac region—a blind man could diagnose those cases—but what are you going to do with the light, mild cases in which the symptoms are not distinct? In one case, which I remember very distinctly, a man had a history of previous attacks of intestinal disturbance, pain, rigidity, tenderness in the right iliac region. The physician said operate, but I deferred operation even with these symptoms. The next day the same condition existed and preparations were made for operation, but the patient passed a calculus from the ureter and the symptoms abated. In typhoid fever not infrequently, at some stage, you will be unable to say whether the trouble is from the appendix or whether it is typhoid. The Widal reaction or leukocytosis may aid in a decision, but in very many cases there will be some stage in which the question is one of serious doubt. I think it is a very serious question whether the surgeon should be compelled by public opinion to cut every doubtful case and remove an appendix, which may not be the cause of trouble, and afterward have the patient go to some other man to remove a tube, excise the gall bladder, take out a kidney or remove a renal calculus, and be cured

DR. L. J. HAMMOND: A man consulted me at my office less than a week ago for an attack of acute gonorrhea of several days' standing. I ordered treatment and told him to return in 3 days. Two days later I found him in bed complaining of severe pain in the right groin since early morning, and he said that the discharge had abruptly ceased. I concluded that the pain was due to some inflammatory condition in the cord. The following morning I received word that he had been removed to a hospital and had been operated upon for appendicitis. The difficulties of diagnosis in a case of this sort are obviously great; the first thought that would occur to one in attendance upon such a case would be that the pain was from some one of the various complications that occur in gonorrhea, notably acute prostatitis, in which the pain would radiate along the branches of the hypogastric plexus to all neighboring regions or an early developing epididymitis (right sided) in which the pain and marked tenderness are often and indeed usually found in this region. It was this last-named condition that was regarded as the cause of his pain, as palpation showed the cord to be extremely tender to touch. There was no pain or any symptom of appendicitis when I saw him a few days before.

DR. ROBERT N. WILLSON: I would like to say a word from the medical side of appendicitis. I think that the surgeons have no truer supporters in the matter of an operation in appendicitis than the medical men. I am glad to hear the opinions of Drs. Deaver and Price to the effect that when delay occurs it is usually due to the surgeon and not to the medical man. I had this fact brought to my attention especially some weeks ago, when Dr. Deaver was good enough to see a case in which I was anxious for operation, but in which he held me back for over a week. The same picture was brought to my mind again in a case that I saw this morning, in which the question of diagnosis and relative importance lay between apical pneumonia, appendicitis and typhoid fever. I would like to refer to one complicating condition, an inflamed ureter, inflamed either from a calculus or from hydronephrosis, or from some other pathologic process, just where it passes the pelvic brim. This may closely simulate appendicitis, since the ureter crosses the pelvic brim not far from McBurney's point. In reply to Dr. Price I would say that the patient referred to undoubtedly has had a history of appendicitis, from his own description. In the last three or four days he has had pain over the right lung, and still more severe pain over the appendix. When we saw him yesterday his temperature was 103°; this morning it was 104.2°. The man is undoubtedly septic. He has a tense abdomen, especially over the right iliac fossa. There is slight enlargement of the spleen and liver. Over the right apex posteriorly, reaching to the angle of the scapula, there are distinct dulness, crepitant rales and tubular breathing.

DR. BRINKMANN: I was prompted to write this paper by an experience which I had 8 or 9 weeks ago. I was called to see a young woman in the early hours of an attack of appendicitis. She had the clinical picture of appendicitis, including the nausea and vomiting. This attack had been excited by the ingestion of a large amount of undigestible material. As a result of my diagnosis I was inclined to operate at once. Her parents asked me to delay for a few hours. I called a few hours later; found a little less pain, but more rigidity. I insisted upon having her removed to the hospital, but later I was telephoned that my services were no longer wanted; that they had changed physicians. I told them I would relieve myself of all responsibility. It came to my notice that a very prominent surgeon had been called in who said she did not require surgery. Her subsequent history revealed an abscess, which was evacuated, drained, and she lived for 8 weeks, dying of septic pleuropneumonia. There is no question that early operation saves these cases. In answer to Dr. Davis in regard to the difficulty in diagnosis, I think we do not pay enough attention to the details. We do not have to make the diagnosis in 5 minutes. I never delayed operation but once, and never regretted it but once. This was in the case of a young colored chap. Fortunately he got well, but during his entire convalescence I felt that I had been responsible for the general peritonitis. I then resolved never to let anything delay me in an operation.

A Case of Resection of the Elbow Showing Results of the Operation.

BY GWILYM G. DAVIS, M.D.

[Exhibited December 9.]

The patient, a young man, aged 18 years, had suffered from active tuberculous disease of the elbow joint for over a year. The bones and joint were markedly affected, carious and caseated, and the surrounding parts infiltrated. There was no movement in the joint and no sinuses were present. The usual operation by a single posterior incision was performed and a gap of 4 cm. (1½ in.) left between the sawn ends of the bones. It was dressed on a straight splint in an extended position and primary union occurred. It is now 9 weeks since the operation. As will be seen he can readily flex and extend the forearm to the normal extent. He also has some power of pronation and supination. All these movements are present but are not as powerful as will be the case when he has strengthened the muscles by use. It is to be remembered that he has not used the arm for a year or more. This case illustrates the excellent results achieved in this operation. It is infinitely to be preferred to a stiff joint. Although many may not care to operate themselves they will be consulted by their patients as to what can be done for ankylosed, deformed and disabled elbows, and this case serves as an example. A good result depends on the following points: (1) leaving a sufficient space, about an inch and a half, between the bones to prevent ankylosis or restriction of motion from occurring again; (2) retaining the attachment of the triceps through its external expansion to the ulna; (3) retaining the attachment of the biceps to the radius; (4) avoiding injury to the ulnar nerve as it passes behind the internal condyle; (5) avoiding injury to the posterior interosseous nerve as it passes through the supinator brevis muscle. Even in cases of considerable loss of bone from tuberculous disease the results have been extremely satisfactory.

PROCEEDINGS

OF THE

Philadelphia County Medical Society.

A Short Supplement to Dr. Barton Cooke Hirst's Paper on the Treatment of Puerperal Eclampsia.[1]

BY JAMES TYSON, M.D.

[Read February 24.]

Two measures of treatment were mentioned by Dr. Hirst in his paper read some weeks ago, which it appeared to me at the time ought to be enlarged upon, but I deferred doing so because of the lateness of the hour.

The first of these was the use of morphin in the treatment of puerperal convulsions. It will be remembered that Dr. Hirst was cautious in recommending morphin, the hypodermic use of which is so strongly urged by some. He was good enough to refer to my own teaching as furnishing the foundation of his belief. It is true I have always advised caution in the use of morphin in Bright's disease, and I believe with reason, because I have seen uremia precipitated by it. At the same time I am not surprised to hear it claimed that the drug has been of signal service in the treatment of puerperal convulsions. Modern clinical studies have cleared up the situation and experiment has confirmed its teaching. The truth is that morphin is dangerous mainly, I am almost tempted to say only, in chronic interstitial nephritis. The majority of cases of puerperal eclampsia are due to parenchymatous or epithelial nephritis. In these morphin may be used with comparative safety, and brilliant results. But since interstitial nephritis is responsible for a few cases, some risks must be run if morphin is indiscriminately used. As a precise diagnosis is not often made, the safest course is to get along without it or defer it until other measures fail.

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[1] See *Proceedings Phila. Co. Med. Soc.*, December 31, 1903.

I have said that experiment has confirmed the results of clinical teaching, and explained them, and I will briefly recount the reasoning. It is well known that the normal kidney excretes many substances taken into the blood by the usual channels, some of which manifest themselves by an odor imparted to the urine. Such is turpentine, which is recognized by the odor of violets; such is asparagus, recognized by a peculiar disagreeable odor remembered by all who have observed it. As far back as 1820, Halin noticed that turpentine failed to evidence itself when administered to a gouty patient, and seventeen years later Roger notes that in two gouty patients who partook of a meal of asparagus the usual odor was not exhibited. Opium has been frequently known to produce toxic effects in nephritis, as witness a teaspoonful of paregoric in one of my own cases referred to by Dr. Hirst. Mercurials are well known to be badly borne by nephritis, while salivation is easily induced by mercury administered in this disease. In like manner iodin, salicylic acid and quinin are not excreted by diseased kidneys.

In 1897 Achard and Castaigne published results of the administration of methylene blue by hypodermic injection, five centigrams of the powder being dissolved in twenty parts of sterile water and deeply injected into the buttock under antiseptic precautions. The patient was directed to pass his urine at the end of one, two, four, eight and twelve hours and so on as long as urine continued to be colored. In normal cases the blue or bluish-green tinge usually appears in the urine within the first half-hour, and always within an hour. In certain forms of nephritis it was found to be several hours before the color appeared. In normal cases the maximum coloration, a deep indigo, is reached in about three hours and the urine is not clear for two or three days. The drug was given subcutaneously in order to obviate errors from varying rates of absorption due to temporary or permanent gastric and intestinal derangements, as illustrated by a case of gastric cancer in which the blue did not appear in the urine until the fifth hour when given by the mouth. Bard and Bonnet in France and Richard C. Cabot of Boston repeated these experiments modifying and extending them and arrived at the same general conclusion with Achard and Castaigne, viz., that impairment of the power to eliminate methylene blue is the effect of renal insufficiency, whether functional or organic, temporary or permanent.

Bard and Bonnet add the important fact bearing on our topic, viz., that while in interstitial nephritis there is delayed secretion of the blue, in epithelial or parenchymatous nephritis the blue passes through the kidneys if anything more quickly than in health, pointing to an excess of permeability rather than a deficiency. To this Potoki and Guenard added the further important fact that the blue passes the kidney as quickly in eclamptic cases as in labors without eclampsia. Menu and Mercier confirm this as to the first appearance of the blue, but noted that in albuminous cases the excretion was prolonged and irregular, the amount of blue showing violent oscillations accompanied by parallel oscillations in the amount of albumin and solids.

Here then is the explanation sought. The convulsions of parenchymatous nephritis may be treated by morphin with safety because the renal epithelium is still capable of eliminating it. And since most of the cases of puerperal eclampsia occur in connection with parenchymatous nephritis it is evident why results are often so brilliant. Should it happen, however, as is sometimes the case, more particularly in cases in which the nephritis has preceded pregnancy, that the disease is interstitial nephritis, the use of morphin is attended with large risk.

The second measure alluded to is the treatment of uremic convulsions by hypodermoclysis or intravenous injection of normal salt solution associated with free sweating and purging, with a view to dilution and elimination of the toxic agencies which produce the convulsion. I can confirm all that Dr. Hirst said about the value of this treatment, but in order to secure the best results I hold that the sweat should precede the hypodermoclysis; nay, more, I think this is necessary in order to avert a danger which I believe exists in connection with the use of hypodermoclysis, for it is quite possible to overload the venous side of the circulation and thus to dangerously dilate the right heart. Indeed, I am not certain that I have not seen a fatal termination precipitated by such a course. If, on the other hand, the blood be first depleted either by blood-letting, and I am certain that we would do well to use blood-letting more frequently in other than puerperal cases, or by sweating and purging, we then make room for the salt solution to be subsequently introduced. The depletion removes a certain amount of toxic matter, while that which remains is further diluted by the salt solution. The sweating and hypodermoclysis may be used daily and even twice a day in urgent cases.

In conclusion, I desire to be understood as still advising caution in the use of morphin in the eclampsia of any form of Bright's disease, but to point out as well the variety in which it may be more safely used.

DISCUSSION.

DR. R. N. WILLSON.—I would like to call attention to a procedure brought forward recently, and among others by McVail in the *British Medical Journal*, which is in the same line with and has the same end in view as bleeding. It consists in the withdrawal of cerebrospinal fluid by means of lumbar puncture, made in eclamptic and uremic conditions. I have read in the last 4 or 5 weeks of 2 series of cases with favorable results in every case. It seems to me it is a little difficult to explain the difference in the action of opium and morphin, as Dr. Tyson has attempted to do, by the form of the nephritis. His theory seems to be that in certain cases opium is dangerous because the epithelium of the kidney is incapable of excreting the drug, and I understood him to intimate that in the renal involvement of eclampsia the renal epithelium is more capable of properly functionating. Even Dr. Carter's results only partially explain this question, and to my mind it is difficult to say whether the renal epithelium or the parenchyma or the general condition of the patient at that particular time is responsible for the harmful effect of the drug. The solution of the problem appears especially difficult since we get the worst results in interstitial nephritis, a condition in which the renal epithelium is not primarily nor most seriously involved. In parenchymatous nephritis, that most commonly seen in eclampsia, the epithelium suffers from beginning to end of the process, as is shown by the large quantity of albumin that is allowed to pass through, as well as by the degenerated epithelial cells that are found in large numbers in the urine, and which are nearly absent in all stages of a truly interstitial nephritis. It seems to me that probably the influence at work in uremia and eclampsia is that pointed out by those who are ascribing the condition to pressure rather than to toxemia, or to both causes rather than the latter. For the same reason I think it fair to assume that in conditions characterized by a free destruction of the epithelium the opium or morphin will remain and exert their influence because the excretion and elimination cannot go on. Why this is not so in eclampsia is the difficult problem to which I am calling attention. The question is an interesting study, and we have not gotten to the bottom of the nature and cause of eclampsia.

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DR. GEORGE M. BOYD.—I agree with the last speaker in the fact that we do not yet know the cause of eclampsia. The concensus of opinion seems to favor the theory that it is toxemic and that it is not a distinctly renal disease. In following the work of the Lying-in Charity for the past 14 years we have been much interested in the cases with interstitial nephritis. I am glad to hear Dr. Tyson favor the use of morphin in cases complicating parenchymatous nephritis. From the obstetric standpoint morphin does seem to be of great aid in checking convulsions. I have not great faith in the medicinal treatment of eclampsia other than by the use of eliminative drugs. I think where many drugs are suggested, it is simply an admission of the fact that we cannot treat the case alone by drugs. Again, from the standpoint of obstetrics, I feel that if eclampsia is a toxemia, if the pregnancy is the cause of the convulsion, that in addition to the medicinal treatment we should institute obstetric treatment, the early emptying of the uterus. I do not mean the forcible emptying of the uterus, but if after elimination has been instituted the convulsions continue then the uterus should be emptied.

DR. R. C. NORRIS.—My observation has been that the best results from the use of morphin in the treatment of puerperal eclampsia have been obtained in the treatment of those cases in which the toxemia is not associated with grave antecedent kidney disease. I think the best statistics of morphin in eclampsia came from Russia, and an analysis of the cases reported made me believe that a large proportion of them were not associated with grave kidney disease. It is interesting to note that Prutz found in 368 collected autopsies some affection of the kidneys in all except 7; in this group of autopsies there were 46% that showed evidence of acute nephritis, with only 11.6% with evidence of chronic nephritis. A large proportion showed structural necrotic changes not unlike those found in other portions of the body, believed to be due to the action of toxins. I believe that morphin is a useful drug, but that it should be used with great discrimination, and my experience has taught its dangers when chronic interstitial nephritis is associated with eclampsia. I am convinced that much harm is done in puerperal eclampsia by the injudicious use of saline infusions. I remember one case in which the patient died of edema of the lungs, in which the condition was not only aggravated, but probably made fatal by the free use of intravenous injections of saline solution. In line with the subject of rapid elimination of toxins from my experience, I have yet to see a case of puerperal eclampsia die in which I could secure free catharsis, 12 to 24 stools in 24 hours, and this drainage through the alimentary canal supplemented by the free use of saline solution by means of hypodermoclysis or enteroclysis. In my experience rapid elimination by Epsom salts followed by hypodermoclysis or high enemas of salt solution is much more rapid and effective than sweating. Sweating helps, but not to the extent of free purgation. The excessive use of infusion of salt solution, with no means of getting rid of it, often will do the patient more harm than good, and edema of the lungs is not an uncommon sequel in such cases. The pathology of puerperal eclampsia is yet shrouded in mystery. From my reading, observation and experience I believe the time will come when we shall recognize the disease as a symptom complex due to several separate and distinct affections; in some cases the causal relation of kidney disease will be very marked; in others the condition will be of toxic origin, at times from the liver, from the intestinal canal, from the fetus or from a combination of one or more of these factors. The relation of kidney disease to eclampsia, I am sure, is of much interest to Dr. Tyson, whose interest and work in kidney affections are so well known. I have under my care a patient, married 19 years ago, whose history will especially interest him. She was a victim of chronic Bright's disease, manifesting itself at frequent and various times. She had a family history of 14 near relatives who had died of Bright's disease. When she was married, Dr. Tyson remarked that her wedding-bell would be her death-knell. Her first pregnancy, in the hands of a physician who failed to recognize the importance of her kidney condition, was followed by eclampsia and death of the baby, but her own recovery. After that pregnancy throughout a period of years her urine showed, under the strain of any acute illness, albumin, hyaline and granular casts. During her second pregnancy she did not develop toxemia, and gave birth to a child who is 14 years old to-day. During her last pregnancy she was placed under my care. Granular casts were not present, but hyaline casts and albumin were present throughout the entire pregnancy. Being of the Catholic faith, and interruption of pregnancy before viability of the child not being permitted, the responsibility of the case bore upon me considerably. Under careful attention the pregnancy progressed to 8½ months with no complication, but within 48 hours alarming symptoms then developed, and it was necessary to terminate pregnancy. This was done in 6 hours, and she gave birth to a living child without having convulsions herself, but the baby had violent attacks of convulsions for 3 days. Under the use of bromids and the free, almost continuous inhalation of oxygen, the baby passed through the convulsions and to-day is apparently perfectly well. To my mind the case indicates that while true kidney disease is a dangerous feature in pregnancy, under some circumstances such a woman will steer clear of the dangers of eclampsia, while under other circumstances they will develop. The case fortifies my belief that true kidney disease, while a very great danger to a pregnant woman, is not invariably the precursor of eclampsia. I have had patients come to the Preston Retreat whose urine was loaded with albumin, hyaline and granular casts, who had no signs of toxemia and who would go through the remaining 2 or 3 weeks of pregnancy without convulsions, while other patients with neither albumin nor casts have developed eclampsia, showing that this can sometimes be a disease independent of the kidney. The practical lessons I have drawn from my experience are that when a patient comes under my care with a history of Bright's disease she is constantly treated and watched, and so long as the kidney lesion is quiescent and there are no constitutional evidences of toxemia she is not in danger. It should be borne in mind, furthermore, that these constitutional evidences may declare themselves with startling suddenness, and within 48 hours the condition may pass from one of comparative safety to one of imminent danger. With regard to the use of morphin, I am glad to have my knowledge further specialized by learning that there is less danger in its use in eclampsia associated with or dependent upon the parenchymatous forms of nephritis.

DR. MORDECAI PRICE.—I think it is fortunate that this paper was brought before the Society following that of Dr. Hirst, in which he condemned the use of morphin. We cannot help but regard the experience of so many practitioners, men who have served their patients for 50 years, who tell you a quart of blood and one-half grain of morphin will cure any case of puerperal eclampsia. These are strong statements, and they do not entirely agree with our own experience in saving. As eclampsia develops in probably 75% of the cases in very young women many times in their first pregnancy, it is shown that chronic kidney disease probably does not exist or cannot exist in many of them. I am convinced that the teaching of the giving of chloroform or ether is a great mistake, the convulsion is simply concealed. In a woman who has blood enough I always take a quart and as much more as she can spare, and I never hesitate to give one-quarter grain of morphin. I am convinced that puerperal eclampsia is not always associated with kidney disease, because I have seen a number of cases of illegitimate pregnancy in young women who did not have a trace of albumin in the urine, in whom the nervous element seemed to be the aggravating cause of the convulsions. My treatment would be (1) bleeding, (2) morphin and (3) free purgation for a patient already in convulsions. I have never yet been induced to bring on labor. If the woman is at term and there is dilation, I do not hesitate to empty the uterus. I believe that with the infusion of digitalis and potassium acetate in large doses all cases can be carried through. I am sure that the recommendation to watch the kidneys is one of the best ever given. I do not believe that because a woman has kidney disease she is going to die. Good men teach that nephritis early in life produces eclampsia in pregnancy. I am convinced that such cases should be watched, but I am also convinced that acute nephritis in children following scarlet fever ought to be curable. The ravenous appetite peculiar to some women prior to labor, resulting in the presence of a large quantity of undigested food in the stomach and intestines, I believe is the cause of much of the poisoning that takes place at such a time.

DR. B. ALEXANDER RANDALL.—I would like to emphasize the value of lumbar puncture mentioned by Dr. Willson, if it be not out of relation to Dr. Tyson's subject, for my experience of eclamptic convulsions has not been with those of puerperal eclampsia. I have seen the greatest relief from lumbar puncture, repeated at need several times a day, in those toxemic cases which come under my notice. I feel that the *therapeutic* value of this measure is not appreciated as it ought to be.

DR. R. N. WILLSON.—Unless I have misunderstood Dr. Norris's statement with reference to eclampsia occurring without kidney involvement, I would like to ask him when next he finds a case in which there has been no albumin in the urine up to the beginning of labor, and in which eclamptic convulsions appear, to have the patient catheterized. I feel sure he will find not only albumin in large quantities, but casts and all forms of renal sediment. In a series of cases which I reported, neither albumin nor casts could be found up to the evening of delivery. In all of these cases the patients were catheterized during the toxic state, and in all albumin and casts were found, and usually all forms of casts, as well as sometimes blood, sometimes renal epithelium. All of these cases except one I followed until complete recovery, and almost without exception the urine cleared up, so that there was no renal sediment to be studied, indicating to my mind that there had been a temporary involvement of the kidney, which after delivery regained its power of functionating. I have seen a number of other series reported with the same results. I think one series was reported from the Polyclinic Hospital. I have also heard Dr. Hirst refer to the fact that there is a large number of cases in which no albumin is found up to the time of the eclampsia. It is always found, however, during the eclamptic attack. I am satisfied from the study of actual cases that there is never a case of eclampsia in which there is not either a temporary or a permanent renal insufficiency.

DR. R. C. NORRIS.—I would like to say, with reference to Dr. Willson's remarks, that it is a well-established fact that 16% of eclampsias do not have albuminuria until convulsions occur. After a convulsion albumin is always found.

DR. TYSON.—I am free to admit that we are far from accurate etiologic knowledge of puerperal eclampsia, yet I do not find the same difficulty that Dr. Willson does in recognizing the greater danger from the use of morphin in interstitial nephritis than in parenchymatous nephritis, because the amount of destruction of epithelium is immensely greater in the interstitial variety. In parenchymatous nephritis there is rather a redundancy of epithelium, too crowded to work well, but still capable of function. I am one of those inclined to believe that epithelial death or destruction in all cases precedes the interstitial overgrowth, and that there is really no such thing as primary interstitial nephritis, but that there is primarily a destruction of the epithelium of the tubal structure which is replaced by interstitial tissue. Of course my omission to say anything about purgation was not intended. I quite agree with Dr. Norris that purgation is quite as useful as sweating if you can produce it and both are better still than either one alone. There are other conditions besides the insufficiency of the kidneys which cooperate to produce different degrees in the severity of symptoms in these cases. In some cases, for inexplicable reasons, the toxic material is more abundant than in others. That which causes the nephritis in puerperal disease is usually regarded as some product of the organism of the mother and her fetus which must vary with circumstances. Then there is the further relation of toxic substances eliminated by the healthy kidney, which adds still more to the accumulation. The greater frequency of eclampsia in acute nephritis is explained by the fact known to us all that the sudden retention of effete matter is much more serious in its effect than its gradual accumulation. Hence, we see uremic convulsions frequent in children with acute nephritis after scarlet fever. I believe we may have eclampsia in puerperal women without Bright's disease. I am confident that while there are cases of puerperal eclampsia that originate, as Dr. Price has stated, from irritative causes quite analogous to the convulsions of teething children, they are rare events. I believe, on the other hand, that the nephritis causing puerperal eclampsia is often overlooked. I have also given a good deal of attention to the subject of the danger of pregnancy ensuing upon a previously existing Bright's disease. I have been taught by experience, as Dr. Norris has, that not every woman with Bright's disease who becomes pregnant will die in her first or second labor from eclampsia. She is in very great danger, but the cautious management of these cases by diet, rest and elimination will avert the fatal end in many instances. Some of these cases terminate so suddenly that there is not time to do anything for them. I have seen this in cases closely watched; perhaps not so thoroughly as at the present day; still they were under treatment, and that, too, with the experience of a previous pregnancy as a guide.

The Plastic Surgery in the University Maternity for the Year 1903.

BY BARTON COOKE HIRST, M.D.

[Read January 13.]

The propriety of repairing the posterior vaginal wall and the pelvic floor after labor by an immediate or intermediate operation is universally conceded. It is curious, therefore, that the other injuries of the genital canal in labor are ignored by the majority of general practitioners and specialists, although they are almost as frequent and have consequences quite as serious as the so-called "lacerations of the perineum." Indeed, when one considers the indubitable relationship of lacerated cervix to carcinoma of that region and the discomfort of a cystocele, it is questionable if injuries of the pelvic floor are not of subordinate importance among the three varieties of traumatism to which the genital canal is subjected in labor. It must appear illogical to the unprejudiced observer to admit that injuries of the pelvic floor should be repaired without fail in the puerperium, but that the other injuries of childbirth, equally disadvantageous to the patient, just as amenable to reparative treatment may be neglected. The writer became impressed with the unimpeachable logic of this view some three or more years ago. After rather desultory attempts at first to apply it in practice, the principle was finally unreservedly adopted. For more than two years not an injury or a pathological consequence of labor has been allowed to remain uncorrected in the University Maternity. Pelvic inflammations, displacements of the uterus, diastasis of the recti muscles, nephroptosis, injury of the coccyx, inflammations and injuries of the pelvic joints, pelvic and abdominal tumors and diseases complicating childbirth, all receive their appropriate treatment.

It is, however, the purpose of this paper to direct particular attention to our experience and results in the primary and intermediate repair of the cervix and of the anterior vaginal wall, regions which have been strangely neglected not only by physicians in general, but by experts in charge of our large maternities.

THE CERVIX. In 53 cases during the past year the cervix has been repaired in puerperal patients.[1] The result has been perfectly good in every case. All of these operations were performed after the fifth day, usually at the end of the first week. Previous experience had taught us that an operation on the cervix before the fifth day was too often followed by infection of the endometrium and fever. At the end of a week this is not the case. We postpone, therefore, the repair of the injuries of childbirth for a week, if the cervix is involved. The patient is put upon an operating table and all of her injuries are repaired by a formal operation under anesthesia. I do this in private as well as in hospital practice and with equally good results.

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[1] The cervix was lacerated in 27.8 per cent. of the women delivered; the anterior vaginal wall in 22 per cent., the perineum and pelvic floor in 83.7 per cent.

THE ANTERIOR VAGINAL WALL. Any one who routinely examines the anterior vaginal wall after labor by pressing a forefinger upward in the sulci toward the pubic bone will be surprised at first to find how frequently the fascia and muscles of the urogenital trigonum are torn through. This is the first step in the pathological process that ends in a cystocele. The laceration is usually submucous, but, whether it is or not, it is as easily and effectually repaired as the analogous injury in the posterior sulci. The operative technique by which this result is secured has been described by the writer in another place.[1] The anterior vaginal wall has been repaired in 42 patients during the past year, in each instance with a perfect restoration of its muscular and ligamentous support. We have, I firmly believe, prevented this number of cystoceles which would otherwise have developed in the future.

We may claim, I think, with this record to have demonstrated that *all* the injuries of childbirth can be successfully repaired during the puerperal convalescence. It is pertinent to inquire, therefore, what valid excuse can be offered for the common practice of neglecting two-thirds of the lacerations of childbirth, while one-third, it is admitted, must be attended to. Why should a woman after labor be only partly patched up? Why should any woman be condemned to years of disability and invalidism as the result of childbirth, and finally be subjected to a secondary operation, when she could be restored to a perfect physical condition during the lying-in period? This is a question which we should seriously consider ourselves before it is forced upon us from the outside.

There is no reason at all why this work should not be properly performed in the maternity hospitals of the country. Any institution of the kind not equipped for pelvic and abdominal surgery, and not provided with a staff competent to give to the patients the attention so many of them require, should obviously either be reformed or suppressed. In private practice, it must be conceded, there are difficulties to overcome, but these difficulties are not insuperable. In the first place, the slipshod methods of the past must give place to a more modern technique. It is impossible either to diagnosticate or to treat the injuries of childbirth properly with the woman across the bed in the first few minutes after delivery, or even, as a recent text-book recommends, before the expulsion of the placenta. The patient should be put upon a table with the legs supported as in any other vaginal operation. A specialist will have a good portable operating table and a corps of assistants, but any general practitioner can secure a kitchen table and can provide himself with portable leg supports. The only assistant he absolutely requires is an anesthetizer. The necessary instrumental equipment is so simple that it is within anyone's means. The aseptic technique necessary for the patient's safety must be familiar to anyone fit to practise obstetrics at all. It has been argued that the adequate repair of the injuries of childbirth would be too much trouble, would not be sufficiently remunerative, would not be tolerated by many patients and is, therefore, impracticable. The same arguments could be urged against any advance in medicine, and if valid would stop all progress. It is true that some physicians who practise obstetrics to-day could not successfully repair any of the injuries of childbirth, but this will not be true of the immediate future. No medical student leaves the University of Pennsylvania who has not served as assistant in several operations to repair all of the injuries of parturition, and no doubt the other medical colleges in the first rank are giving their students equal advantages. It is exhilarating to think what this improved training can accomplish in preventive medicine. If every woman received the attention she ought to get after childbirth, three-fourths of the diseases of women would disappear.

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[1] In the fourth edition of his text-book on obstetrics and in the text-book on diseases of women.

DISCUSSION.

DR. MORDECAI PRICE.—I think that no man should leave the bedside of a parturient woman without repairing all injuries of the birth canal. I disagree with Dr. Hirst as to the advisability of repairing the cervix, unless the laceration is one that includes an artery with a resulting hemorrhage. The cervix is very much dilated and to attempt to repair it is in my judgment an oversight and a miscarriage of surgery. To repair the perineum and lacerations on the anterior wall of the vagina after a week or 2 weeks is simply a blind procedure, for one is dealing with inflamed, indurated and probably septic tissue and is almost sure to have bad results. I do not care what the result is in the University of Pennsylvania, the result elsewhere is bad. The time to repair a woman is instantly, while her hips are on the edge of the bed and while the parts are numb from pressure. The laceration can then be closed without an anesthetic which is always to be used carefully in the practice of obstetrics.

DR. JOHN B. DEAVER.—The repair of the tissues of the perineum from a week to 10 days after the tear is a very uncertain procedure. There is no certainty of uniting the tissues layer to layer at this time. I cannot do better than compare suturing the perineum at the time referred to above, to the introduction of secondary sutures in a granulating wound of the abdominal walls with the hope of preventing subsequent hernia.

DR. R. C. NORRIS.—This question is of great interest to men who do obstetrical work. It is contrary to the usual teaching and practice. I think the 2 gentlemen who have spoken assume that Dr. Hirst always leaves the perineal operation until the end of the week whether the cervix is to be repaired or not. I presume that when repair of the perineum alone is required, he would take advantage of the immediate operation. Immediately after labor the cervix is dilated, edematous and distorted. Failures of immediate operation in the past have been no doubt due to this fact and because of the large number of failures with primary operations most operators gave it up. It seems to me that the delay of 4 or 5 days to repair the cervix puts the cervix in better condition to secure primary union than if it were operated upon immediately, and that fact explains the good results. In well-equipped, modern hospitals, where everything can be done with the strictest surgical asepsis, these results which Dr. Hirst has had (53 cases of successful operations on the cervix) speak for themselves. No theoretical argument can stand against that fact. My own feeling is that when we come to apply this principle to private practice we are confronted with the way the man in private practice would probably do this work, and the practical value of the procedure must be approached from 2 viewpoints: What the expert can do in the hospital and what the general practitioner will do at the bedside of the patient. It seems to me that the safe course for the general practitioner is not to attempt to repair the cervix, even after 5 days. While the chances for infection are less than just after labor, it is a good and practical rule for the general practitioner to look upon the puerperal patient as one not to be touched or handled. I do not mean to undervalue this work done in a well-equipped hospital. From the standpoint of the general practitioner it has a certain amount of danger. Immediate operations upon the cervix heretofore have given a large proportion of failures In my opinion the advantages of primary operations on the vagina and perineum need no argument. As to lacerations of the anterior vaginal wall, they certainly should be repaired when the posterior wall is repaired. In the absence of lacerations through the mucous membrane, which are rare in the anterior vaginal wall, I see a practical difficulty in detecting submucous lacerations 5 days after labor. Cystocele is almost always present at that time and disappears very often as the involution of the vagina progresses.

DR. HIRST.—In the opening paragraphs of the paper it was expressly stated that nothing was said about the perineum, but that particular attention was called to the operative repair of the cervix and of the anterior vaginal wall which is not commonly done. If any one, however, would like to see a perineum successfully repaired a week after labor, there are often a dozen or more cases convalescing at one time in the University Hospital. The perineum is always repaired after the fifth day if the cervix must also be repaired. Naturally, the raw surfaces are denuded by a sharp curette, the edge of a knife or by scissors, as the case may require. This proposition to repair *all* the injuries of childbirth is a new movement and opposition is to be expected. There was the same opposition to the repair of the pelvic floor and perineum. Precisely the same arguments were used against it. No doubt the arguments heard this evening against the repair of the cervix and the anterior vaginal wall will, 10 years hence, sound as antiquated and peculiar as similar arguments against the repair of the pelvic floor and perineum would seem to-day. For example, to-day the stitches were removed from 2 private patients in their homes. In both women the pelvic floor, anterior vaginal wall and cervix were torn. A week after labor all the injuries were repaired. At the end of 4 weeks from the time of her delivery such a patient will leave her room in perfect physical condition and without the necessity of going to another surgeon in the future to be patched up. If the question were left to the general public I think they would choose this course. These patients themselves most certainly approve it. I am sure that in time the profession will see that it is better for the patient to make one convalescence from the labor and its injuries, than to be subjected to another operation in the future with perhaps meanwhile an irremediable impairment of health and nervous strength. Personally, I believe that this course will be adopted at least by specialists all over the country before long. It would undeniably be better for women in general if all physicians *fitted* themselves to adopt it with safety to their patients.

A Note on Cerebrospinal Symptoms in Infectious Diseases Apropos of a Case of Typhoid Fever.

BY ALFRED GORDON, M.D.

[Read February 24.]

During a very long time there was a belief that each organ lived separately from the rest of the body and that the suffering of one organ had no influence on the others. An entirely different view is held now: there is a unity and solidarity among various parts of the living organism: when one organ is affected, the entire system suffers. A bacillus, typhoid for example, produces a local focus of infection in the intestines, but the toxins circulating in the vascular system will have an influence on the whole economy by means of their chemical combinations with Ehrlich's lateral chains of the cells. The characteristic feature of toxic agents is that each has a special affinity for certain protoplasmic molecules and cells of certain organs. An infectious agent will attack with preference a certain organ primarily, but the poisons secreted by it will show their secondary effect throughout the entire system.

The nervous system, generally speaking, presents a feeble organic resistance to toxic products. It is, therefore, very frequently affected in infectious diseases, but the character of the involvement of the nervous system is not always the same. While in some cases the infectious agent or its toxins produce profound and unalterable changes, in others its effect shows itself only in *transient* circulatory changes. The latter may, however, be sufficiently pronounced to present clinical phenomena indicating disturbed functions of certain centers. Owing to the fact that the changes of the nervous system are dependent upon the localization of the infectious element, it is readily understood that all possible forms of cerebral or spinal disease are met with. There are, however, certain forms which are frequent and others that are very rare. General symptoms pointing to an involvement of the meninges of the brain are of frequent occurrence. Delirium, stupor and general prostration also belong to the frequent complications. The peripheral neuron in whole or in part suffers not infrequently in infectious diseases: anterior poliomyelitis, transverse myelitis and multiple neuritis are the forms we meet with now and then. Hemiplegia, however, occurs mostly in childhood, more rarely in adults. Symptoms pointing to an involvement of cerebral ganglia or of special centers of the brain are not frequent. Such cases have been reported, but they are comparatively few.

It is difficult to find the proper reason for the fact that while symptoms of organic disease of the brain are rare, symptoms of involvement of the meninges are frequent. A still greater difficulty one finds when an explanation is sought for to determine the cause of *transient* forms of organic diseases of the cerebrospinal system. That an infectious agent or its products are liable to injure permanently a certain portion of the cerebrospinal system and produce secondary degenerative processes is a matter to be easily conceived; but the disappearance of a genuine hemiplegia or other paralysis without any consequences is certainly unusual and difficult to explain. However, the conception of a localized meningitis is sufficient most of the time to explain the nervous phenomena observed in infectious diseases. The absence post-mortem of inflammatory processes in centers of the nervous system in those cases which presented *ad vitam transient* symptoms of nervous diseases does not exclude the possibility of a localized meningitis in a great many cases. The existence of serous meningitis and of curable meningitis is proven beyond doubt.

The most recent investigations of the nature and of the chemical composition of the cerebrospinal fluid in meningitis are of a very great importance for diagnostic purposes. The studies of this fluid, and especially its cytology, have shown conclusively that between the very favorable cases and the fatal ones there are various degrees of meningitis. This circumstance gives us a key to understand why in some cases the nervous phenomena are multiple and at the same time transitory in character.

The case I am about to report offers a peculiarity from the latter standpoint. Its symptoms were multiple and pointed to a grave involvement of both the brain and the spinal cord. The association of the symptoms was quite unusual, as in the literature at my disposal I could not find a similar case. Finally, the peculiarity of the case lies in the transitory character of the apparently grave symptoms.

The history of the case is as follows:

G. W., colored, 17 years of age, was admitted to the Douglass Memorial Hospital, November 17, 1902. The data regarding the onset of his illness before his admission, the examination on admission and the subsequent course of the disease, corroborated by a positive Widal test, proved that he was suffering from a typical, but uncomplicated case of typhoid fever. On the day of his admission his temperature was 102° F. A few days before he was brought to the hospital, the relatives said that he lost suddenly his speech and was unable to stand and walk. The patient came under my observation 10 days after his admission, and these are the symptoms I found. Total motor aphasia, agraphia and word-blindness, but no aphonia; right hemiplegia, including the face, but the motor paralysis was not much pronounced; slight hyperesthesia of all forms of sensations on the same side; rigidity in both lower extremities with ankle clonus, greatly exaggerated patellar tendon reflexes and Babinski sign on both sides. The patient was unable to stand unsupported or to walk. There was also incontinence of urine and feces. The total absence of hysterical stigmata and the previous history of the patient made me reject the possibility of a functional nervous disturbance.

At the time the examination was made the patient had entered into convalescence of his original disease. In view of the multiplicity of the symptoms, out of proportion with the patient's general condition, I made a favorable prognosis. The patient gradually improved and made an uneventful recovery. He left the hospital in perfect health.

The case appeared to me to be of sufficient interest to warrant me reporting it. The great number of symptoms pointing to grave cerebral and spinal lesions developed in the course of typhoid fever and having disappeared with the recovery from the latter disease appear to me to be very instructive for the following reasons:

(1) An apparently mild case of typhoid fever without any complication in other viscera may affect the whole cerebrospinal system simultaneously.

(2) The nervous symptoms may be very much pronounced and multiple in spite of the mildness of the original disease.

(3) These multiple and marked organic nervous symptoms may be out of proportion to the general conditions of the patient, as generally speaking we know that the more the infectious disease is pronounced in its course, the more profound is the toxemia and the more symptoms of complications can be expected.

(4) The prognosis is usually favorable in cases in which this *disproportion* is present, as these apparently alarming symptoms are only transitory in character.

The case is also unusual from this point of view, that if aphasia and hemiplegia in the course of typhoid fever were rarely observed, agraphia and word-blindness to my knowledge were not reported.

DISCUSSION.

DR. CHARLES W. BURR.—I have never seen in typhoid fever or after typhoid fever a patient presenting the symptoms that Dr. Gordon relates, and I confess that I am not sure that this was a case of typhoid fever. It is a dangerous thing for a man who has not seen the patient to criticise the opinion of the man who has seen and is treating that patient; at the same time, any such series of symptoms occurring in typhoid fever must be very uncommon. The common nervous complication of typhoid fever is an inflammation of the anterior cells of the spinal cord with palsy and some wasting, most marked in the legs. After that general multiple neuritis is the most common thing, with nerve and muscle pain and palsy of the extensor muscles of the arms and legs. The multiple neuritis I think usually gets well. In cases in which the spinal cord is diseased there is almost always some palsy and wasting remaining; some muscles of the calves and some muscles of the thigh. There will be some foot-drop or some sign that the man will bear until he dies. I think the most frequent cerebral symptom of organic disease in typhoid fever is hemiplegia with or without aphasia and that, when organic, is due almost always to a thrombus, usually in the middle cerebral artery. There are cases of hemiplegia and aphasia which occur in typhoid fever in which there is no lesion perceptible after death. The same occurs in Bright's disease. Microscopically you may find some change, but there is no lesion perceptible to the naked eye. In practically every case of typhoid fever there are symptoms of mental depression or hebetude, mental wanderings; sometimes hallucinations. These are so frequent that they are distinctly a part of the disease.

DR. F. SAVARY PEARCE.—The prognosis of neuritis or meningomyelitis following typhoid infection in my experience has been good. I have in mind a man shown before this Society who had meningomyelitis, and who recovered from every marked sign of organic disease (spasticity, gait and contractures), until to-day, 4 or 5 years since the inauguration of these symptoms, he is perfectly well. This seems to be evidence that the nervous system possesses a considerable degree of immunity to the toxemias. Therefore, when (the origin being infectious) there is a central lesion the condition is probably an irritative one, due to disease of the meninges and not to degeneration in the lateral tracts. Cases of tuberculous meningitis following spondylitis are favorable in prognosis. I have a child now under my care who had absolute paraplegia for a year, following tuberculous meningitis, who under extension treatment for a month has so greatly improved that I believe within a year there will be complete recovery. The failure to find lesions after death in cases of palsy following infectious diseases and other diseases is interesting. To-day I was examining with Dr. Allen J. Smith at the Philadelphia Hospital the brain from a case of apparent organic hemiplegia in an elderly woman. After the most careful examination (and with the absence of Bright's disease) no macroscopic lesion could be found. So in these cases as in Bright's disease it must be that the intoxication has been sufficient to allay the function of the brain cells governing the particular part affected. It seems to me that there are many infections not known that will set up symptoms of organic disease. Reasoning from such a theory, in hysteria such a palsy may have been set up by the circulation of some poison sufficient to produce lasting loss of function, but no trophic change in the brain cells results. Whatever the poison may be, chemical or *bacterial*, neural energy is often permanently inhibited, and function of the peripheral part is often forever destroyed.

DR. MYER SOLIS COHEN referred to a case which showed meningitic symptoms which he considered to be due to influenza. A child had been going regularly to school, when suddenly one afternoon he developed a severe headache. On examination I found the lungs and heart normal; there was rigidity of the neck, and intense hyperesthesia, more marked on one side; Kernig's sign was present; the temperature was 103° F., pulse and respiration corresponding to the temperature; the throat was very much inflamed. There was no tache cérébrale and no eruption. Believing the case to be one of influenza, I put the child upon a mixture containing sodium salicylate and sodium benzoate. The symptoms persisted and the temperature remained high for 3 days. At the end of the third day the temperature was normal, the headache disappeared, Kernig's sign was absent, and nothing remained but some slight hyperesthesia. It seemed to me that the symptoms were caused by an acute influenzal infection.

DR. GORDON.—When an infectious disease sets in, no matter how mild it may be, the greatest attention should be given to the prompt elimination of the poisons or so-called toxins, the nature of which is unknown to us. This

should be done as quickly and as freely as possible. In cases in which it is possible it is well to institute the ideal treatment, the so-called serum treatment, in order to produce immunity. Various forms of nervous disorder are observed in infectious diseases: some of them are permanent and some transitory. There are a number of record cases of cerebrospinal disturbance due to various infectious diseases, and among them disseminated sclerosis, myelitis, hemiplegia, aphasia, anterior poliomyelitis and so on (Charcot, Schoenfeld, Wispham, Marie, Lotch, Rendu, and others). It was not so much the importance of knowing the permanent forms as the transitory character of some, which was my object in writing this paper. If a physician is confronted with a case in which he observes grave conditions he becomes sometimes unnecessarily alarmed. There is sometimes a disproportion of the symptoms observed in comparison with the general condition of the patient which should indicate a favorable prognosis. I would emphasize the necessity of considering every mild case of infectious disease a serious one in order to take hold of the case in a serious manner as soon as possible and eliminate the poisons, whatever they may be, as quickly as possible. A word about the hypothetical pathogenesis. Some say the symptoms are due to microorganisms, others to their toxins. In a contribution based upon clinical, pathological and experimental data, which I reported sometime ago, I endeavored to show the rôle of infection and intoxication in diseases of the spinal cord. I said that perhaps the chemical elements of the toxins are at fault, as, for example, carbonic acid, hydrogen sulphide, ammonia gas, etc. On the other hand, we know that these chemical agents, independently of infectious diseases, are capable of producing real diseases of the nervous system. The question arises whether the so-called toxins in the broader sense are at fault or only their chemical substances.

Condition of the Blood in Patients suffering from Pulmonary Tuberculosis.

BY JOHN M. SWAN, M.D.

[Read January 13.]

The study of the condition of the blood in the patients suffering from pulmonary tuberculosis who furnished the material for this paper was made possible by the kindness of Dr. Julius L. Salinger, who placed his tuberculosis ward in the Philadelphia Hospital at my disposal. The paper is based on the counting of the erythrocytes, the counting of the leukocytes, the estimation of the hemoglobin, the differential count of the leukocytes and the search for the iodine reaction of the leukocytes in twenty-five cases of pulmonary tuberculosis and one case of extensive cavity formation in the lung due to bronchiectasis.

In studying the results of these blood counts I shall adopt the classification of Grawitz[4], who divides the disease into three stages: a first stage, in which there is a beginning affection of the apex, without cavity formation; a second stage, in which there are symptoms of cavity formation with slight fever or without fever; and a third stage, in which hectic fever is present.

FIRST STAGE. There is one patient who represents the first stage of consolidation of the apex, without cavity formation. This patient showed a slight reduction of the erythrocytes to 3,980,000; a normal number of leukocytes, 10,000; and a moderate reduction of hemoglobin to 70 per cent. This patient improved very much under treatment and was finally discharged without symptoms and with few physical signs. As his general condition improved there was a corresponding improvement in the blood picture; the erythrocytes rose to 4,580,000 and the hemoglobin increased to 82 per cent. With the improvement of the blood condition the leukocytes rose to 16,600.

An examination of the differential leukocyte count of this patient shows that the relative proportion of the different cells was not changed The treatment, under which the patient greatly improved, apparently caused an increase in the eosinophiles from 1.6 per cent. to 3 per cent.

SECOND STAGE. There are eight patients representing the second stage of the disease; the stage of cavity formation without fever or with but a slight febrile reaction.

Among these patients, the erythrocytes were usually normal in number; in four instances they were present in greater numbers than 5,000,000 to the cubic millimeter; and in one instance they numbered only 3,680,000. The range of the erythrocyte count was from 6,710,000, in a negro who had complained of cough for eight years, to 3,680,000, also in a negro, who had been ill for two and one-half months and who had albuminuria.

Seven of these patients showed a leukocytosis varying from 34,000 to 11,120 and one showed a leukopenia of 7,100. The latter patient had carried a cavity in his right lung for a number of years and the disease was stationary.

In these patients the differential counts showed, as a rule, a percentage of polymorphonuclear cells above 80, the highest being 93.4. In 3 cases the polymorphonuclears formed 70.4 per cent., 73.6 per cent. and 78.8 per cent. of the leukocytes respectively. In one patient the first examination was made during an asthmatic paroxysm and showed 80.8 per cent. of polymorphonuclear cells. A second examination was made about four weeks later, after the asthmatic paroxysms had ceased, and gave 78 per cent. of polymorphonuclear cells. Eosinophile cells were present in all of these patients except two, in proportions varying from 3 per cent. to 0.2 per cent. The two patients from whose blood these cells were absent left the hospital before a second examination could be made and their ultimate fate is unknown.

The hemoglobin varied from 90 per cent. to 63 per cent., although all patients showed some pallor of the skin and the mucous membranes. Indeed, in some instances, the percentage of hemoglobin was at first thought to have been erroneously estimated until more than one trial showed the reading to be accurate.

THIRD STAGE. There are fifteen patients who may be placed in the third stage of the disease, that of hectic fever. In these patients the erythrocytes were usually reduced in number, although a normal number of these cells was occasionally found. The counts ranged from 5,710,000 to 2,890,000, with an average of about 4,019,130. The highest count was obtained from a patient who was rapidly improving under treatment; indeed, he might be placed in the second stage of the disease, but for the fact that a former count was made while he was having marked hectic fever.

The leukocytes were usually increased in number, giving a leukocytosis of from 247,000, in a very rapidly progressing case, to 10,080. Five patients gave a leukocyte count below 10,000: 8,480, 7,600, 7,600 to 9,600, and 6,733 respectively.

The polymorphonuclear cells were usually above 80 per cent., varying from 97.6 per cent. to 80 per cent. In five instances these cells formed less than 80 per cent. of the entire number of the leukocytes, varying from 78.8 per cent. to 69 per cent.

The eosinophile cells were usually absent from the blood of those cases that proved fatal.

The hemoglobin varied from 95 per cent., in a patient who was improving on treatment, to 35 per cent. A rise in the hemoglobin percentage was usually noted just before death and was attributed to the sluggishness of the peripheral circulation as the end approached.

In the case of a patient who failed rapidly and who died about forty-three days after admission, the erythrocytes numbered 3,800,000, 3,820,000, 3,020,000, and the day before death 4,600,000. In this patient the leukocytes were always below 10,000: 7,600, 7,000, 6,300, rising the day before death to 9,600. The hemoglobin varied from 50 per cent., 55 per cent., 55 per cent. to 85 per cent. the day before death. The percentage of polymorphonuclear cells was 77.2 per cent., 80 per cent., 78.8 per cent. and 80 per cent. respectively. When the blood was first counted there were 0.4 per cent. of eosinophiles, but twenty-four days later these elements had disappeared and were not again found in the peripheral blood.

COMPLICATIONS. The series of cases comprising this study contains two cases of pulmonary hemorrhage, six cases of albuminuria, two cases of tuberculous diarrhea, five cases of pleurisy and one case of asthma.

HEMORRHAGE. One patient had been spitting blood for two weeks and had had two distinct hemorrhages, the last one a few days before the blood examination was made. The hemoglobin suffered a marked reduction (55 per cent.); the erythrocytes numbered 5,220,000; there was no leukocytosis (8,480). There were no nucleated erythrocytes and the differential count showed nothing abnormal.

The second patient had two hemorrhages on May 25. On May 28 his hemoglobin was 55 per cent., there was a leukocytosis of 15,800, but the erythrocytes numbered 4,380,000. The lymphocytes were reduced to 7 per cent., and there were 14.4 per cent. of transitional forms. The man had a third hemorrhage on May 30, and two days later the erythrocytes numbered 3,430,000; there was a leukocytosis of 20,700, and the hemoglobin was reduced to 55 per cent. There were no nucleated erythrocytes.

ALBUMINURIA. Albuminuria seems to have little if any influence on the blood picture. Of the six cases in which this complication was noted the erythrocytes varied from 6,710,000 to 2,890,000. The leukocytes varied from 24,240 to 7,600. The hemoglobin varied from 37 per cent. to 90 per cent. The polymorphonuclear cells formed more than 80 per cent. of the total number of leukocytes except in two instances. Eosinophile cells were absent from the peripheral blood in all except two instances.

TUBERCULOUS DIARRHEA. Two patients suffered from tuberculous diarrhea. In both of these patients the erythrocytes were reduced and the leukocytes were increased in number; the hemoglobin was markedly reduced and the polymorphonuclear cells formed more than 80 per cent. of the total number of leukocytes.

PLEURISY. Of the five cases of pleurisy the most constant feature of the blood examination was the leukocytosis. One patient did not show the reaction, his leukocytes numbering only 8,100. In the others the leukocytes varied from 10,600 to 34,000. The polymorphonuclear cells constituted the bulk of the leukocytes in these cases.

Case No. 24 presented nontuberculous cavities in the posterior portions of both lungs. This patient's blood count showed 4,750,000 erythrocytes; 15,400 leukocytes; hemoglobin, 70 per cent. The polymorphonuclear cells formed 81.2 per cent. of the leukocytes, and there were 1.8 per cent. eosinophiles.

IODIPHILIA. I did not succeed in demonstrating the iodine reaction in any of my specimens. Locke[2] has found this reaction absent in uncomplicated tuberculosis; but Da Costa[6] has found it present in septic cases.

EOSINOPHILIA. As the study progressed, my attention was attracted by the fact that eosinophile cells were not to be found in many of the specimens, and it soon became apparent that the cases in which these cells were absent were fatal ones. There are five exceptions to this, however. Case 9 at the time of the examination showed 0.4 per cent. of eosinophiles, and he is known to have died, although how long after the examination I am unable to say. Case 12 showed 0.8 per cent. of eosinophiles four weeks before death; but when a second examination was made, two weeks before death, no eosinophile cells were present. Case 17 showed 0.4 per cent. of eosinophiles forty-two days before death, but examinations made seventeen, six and one day before death showed absence of eosinophiles. Case 24 showed 1.8 per cent. eosinophile cells, and the patient died after a surgical operation for the drainage of a nontuberculous pulmonary cavity.

Cases 6, 7 and 10 showed absence of eosinophiles when the blood was examined, but these patients left the hospital, and their fate is unknown.

Cases 25 and 26 were under treatment which apparently produced much improvement in the physical condition of the patients. In these patients the eosinophiles increased as improvement progressed; in 25 rising from 0.2 per cent. on the first examination to 1.6 per cent. on the second; in 26 rising from 1.6 per cent. to 3 per cent.

I am inclined to believe that the presence or absence of eosinophiles in the peripheral blood of tuberculous patients is a sign of some prognostic significance. Levaditi[1] makes the following statement: "Tuberculin, among the bacterial products, appears to have eosinophilous properties. Jurgens has already shown, in tuberculous patients who succumbed in the course of treatment with tuberculin, an increase of the number of white cells of the blood. Tschistowitch, Grawitz, Bischoff, and Botkin examined the blood during life and discovered quantities of eosinophiles much above normal. This oxyphilia appeared also, according to the more recent statements of Bettman, in the course of the treatment of tuberculosis with tuberculin and with cinnamic acid." Zappert[15] also found an increase of eosinophile cells after injections of tuberculin; but in four out of eight cases of pulmonary tuberculosis these cells were reduced in number and in another of the eight cases they were absent. There is no note concerning the ultimate fate of these five patients.

Claude and Aly-Zaky[3] say that treatment of experimental tuberculosis in guinea-pigs produced changes in the blood formula as seen in control animals. In those animals in which treatment resulted in deferring the fatal termination, the eosinophiles were found increased, even as high as 12 per cent. in some cases, particularly in the period of initial reaction to the infection.

Cabot[5] says that in most cases associated with leukocytosis eosinophiles are absent. They may be increased in cases with cavities in which possibly the individual inoculates himself with tuberculin manufactured in the cavities of his own lungs.

Brown[8] quotes Teichmüller's statement that an increase of the eosinophiles in the blood and in the sputum of tuberculous patients is a favorable prognostic sign. Brown, himself, agrees with the observation of Teichmüller that the percentage or absolute number of eosinophile cells present is of real value in the prognosis of tuberculosis. Teichmüller's work[14] was done on sputum, which he stained by various methods, principally by eosin and methyl blue. He believes that in bad cases eosinophile cells are usually absent from the sputum, although an isolated cell may be found occasionally. He considers the study of the eosinophile cells in sputum an indispensable aid. It gives a method of estimating the resisting power of the patient, of determining the prognosis and of critically estimating the value of special therapy.

Ehrlich and Lazarus[9] account for the occurrence of a polymorphonuclear leukocytosis by the chemotactic influence of certain bacterial products. The neutrophile cells are the ones ordinarily drawn from their storehouse in the bone-marrow by this chemotactic influence of substances circulating in the blood stream.

The majority of the bacterial products is positively chemotactic for the neutrophile cells; while only a few substances, among which tuberculin is included, according to the observations of the authors just quoted, are positively chemotactic for the eosinophile cells. The variation of the eosinophile cells in the circulating blood of tuberculous patients may be explained as follows: In cases of incipient tuberculosis eosinophile cells are present in the blood stream in about normal proportion, because there is not enough tuberculin manufactured in the lesions to produce a marked eosinophilia. When, however, the secondary infection with the organisms of suppuration occurs, the neutrophile cells are attracted by the chemotactic power of the products of their growth which circulate in the blood, and the eosinophile cells are repelled, so that we find an excess of polymorphonuclear neutrophile cells in the peripheral blood. As the patient gradually becomes more saturated with the latter poisons and the fatal termination approaches, the eosinophiles progressively diminish in number and disappear from the peripheral blood. If, however, the progress of the case is influenced favorably by treatment, the symptoms of the secondary infection disappear and the chemotactic influence of the products of the pyogenic organisms is withdrawn, so that the tuberculin being produced in the lesions may exercise its chemotactic influence to attract the eosinophilous polymorphonuclear cells from the bone-marrow into the blood stream.

CONCLUSIONS. 1. The blood picture in pulmonary tuberculosis is not constant and the conditions described by Grawitz[4] are by no means absolute. There are cases in each of the three stages of the disease that are quite out of the limits of cellular and hemoglobin content described by him.

2. Omitting the exceptional cases from consideration, however, the average case in the first stage of the disease presents a slightly reduced number of erythrocytes, a moderate reduction of the hemoglobin and about a normal number of leukocytes. The average case in the second stage presents a varying degree of leukocytosis, due to an increase in the number of polymorphonuclear neutrophile cells. The erythrocytes are present in about normal numbers, and the hemoglobin is often normal in percentage. The average case in the third stage will show a reduction in the number of erythrocytes, a moderate leukocytosis, composed of the polymorphonuclear neutrophile cells, and a high hemoglobin percentage.

3. Hemorrhage is usually followed by a marked reduction in hemoglobin and a slight reduction in the number of erythrocytes. Leukocytosis is not an invariable feature of a posthemorrhagic blood.

4. Albuminuria, of itself, appears to cause no constant change in the blood picture.

5. Tuberculous diarrhea is apparently attended by a reduction of the number of the erythrocytes and of the percentage of hemoglobin and by an increase of the leukocytes. The latter increase is due to the polymorphonuclear neutrophile cells.

6. Pleurisy is usually accompanied by a polymorphonuclear neutrophile leukocytosis.

7. There is no distinctive blood picture that will serve to differentiate between extensive cavity formation due to tuberculous degeneration and that due to other causes.

8. The leukocytosis occurring in the course of pulmonary tuber-

culosis is due to an increase of the polymorphonuclear elements and not to an increase of the lymphocytes or of the transitional cells.

9. The absence of the eosinophile cells from the blood may be looked upon as an unfavorable prognostic sign. The increase of these cells while the patient is under treatment may be taken as an indication that the progress of the disease has a tendency to become arrested.

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Two Cases of Death from Hemorrhage during Pregnancy.

BY MORDECAI PRICE, M.D.

[Reported February 24.]

On February 19 I was called to see a woman who had been taken sick at midnight. Between that time and 10 o'clock in the morning she had had four different physicians. She was sitting up in bed with agonizing pain and with a death-like pallor; there was no pulse in the carotids. She had been pregnant for 6 or 8 weeks and had been in seemingly perfect health. All at once she had a terrible pain and became very pale. From her pallor and from the fact that she had missed a period I diagnosed her condition as a ruptured tubal pregnancy and at once prepared to operate. The abdomen was apparently filled with blood, probably 3 to 4 quarts with a few clots. The special feature was that I could find no evidence whatever of a tubal pregnancy. There was no large, thickened and indurated tube; no placental or fetal mass in the pelvis or peritoneum, but within ½ inch of the cornu of the uterus there was a hole as large as a buckshot, and there was a varicose condition of that appendage. There was a normal pregnancy of between 6 weeks and 2 months.

The second patient was seen on February 23. She was taken sick at about 2 o'clock in the afternoon. With Dr. Roderick, who had made a diagnosis of extrauterine pregnancy, I operated at 4 o'clock, with the understanding that there was no hope, that I thought that the patient would die on the table, but that I would make the effort to save her life. I found the abdomen containing all the blood in her body; there was no pulse in the neck; there was identically the same buckshot perforation within ½ inch of the cornu of the uterus, with no indication of abnormal pregnancy.

Two or 3 other times in my experience I have found the same condition, but I believed I was not sufficiently careful in looking for the product of conception, the placental tissue or its development. I believe there is such a thing as death during normal pregnancy from rupture of the veins or vessels of the broad ligament. I know that these patients showed none of the symptoms of ruptured tubal pregnancy, nothing but this buckshot-like perforation within ½ inch of the body of the uterus. The hemorrhage in both cases and the mortality, one in 36 hours and the other in 4 hours after operation, were striking. I call attention to the cases because I believe they represent a condition that is even far more serious than extrauterine pregnancy, because there is not the swift fatal termination. My opinion is that death occurred from rupture of a normally pregnant uterus.

PROCEEDINGS

OF THE

Philadelphia County Medical Society.

Massage of the Heart for Chloroform Collapse.

By W. W. Keen, M. D., LL.D., F. R. C. S. (Hon.)

[Read March 23.]

A fatal result during an operation is so rare that such cases should be reported, together with the means employed for resuscitation of the patient, especially when the means are novel. On only three occasions in my entire professional life have I been so unfortunate as to have a patient die on the table. The first two were respectively cases of operation on the brain and goiter. In both of these cases hemorrhage was the cause of death, and all the usual means were unavailing.

The third case of death on the table and the first case of massage of the heart here reported is of more than usual interest not only on account of the method employed for resuscitation, though, unfortunately, it was unavailing, but because of the prior fracture of the skull with entire recovery from mental as well as physical symptoms.

The notes of the second case have been kindly sent me by Dr. Kristian Igelsrud, of Tromsö, Norway. He was present when I operated upon the first case, and as I was greatly interested in the account of his own case, I requested him to let me have the notes for publication, which he has kindly done.

Case I (Keen).—*Fracture of the skull followed by aphasia and partial loss of word memory; trephining; restoration of speech; recurrent hoarseness; development of squamous epithelioma of both vocal cords; unilateral laryngectomy; recovery; total laryngectomy; death from chloroform collapse; ineffectual attempt to restore life by massage of the heart.*

The patient, John H., was first seen December 13, 1902, at the instance of Dr. Charles E. McGirk, of Phillipsburg, Pa., and Drs. B. Alex. Randall and Walter J. Freeman, of this city. These gentlemen furnished me with the followings facts: Prior to the accident about to be described he had always enjoyed good health, and had never suffered from hoarseness or any other trouble with his speech. In 1900, about two years before I saw him, he was struck on the left side of the head by a piece of paving brick thrown by accident, causing a fracture of the skull. Dr. McGirk writes me that his father, Dr. J. D. McGirk, saw him about 20 minutes after the accident, found him partially conscious, but unable to speak, and made the remark that he was drunk. The patient, however, by signs conveyed to Dr. McGirk that he wanted paper and pencil, and upon this being furnished, he wrote that he was not drunk, but had been hit with a brick on the head. Dr. Charles E. McGirk saw him the next day, "when he could articulate words with great difficulty, and was suffering from motor aphasia and partial loss of word memory. He was unable to say many words, especially those beginning with 'b,' even after repeated trials. He would be talking and stop in the middle of a sentence, unable to proceed for some seconds on account of his inability to speak the remaining words, but knowing perfectly what he wished to say. Finally memory returned to him and he would complete the sentence. Along with this disturbance of speech slight hoarseness appeared, but about 2 months after the accident the hoarseness disappeared while the aphasia still remained." Dr. McGirk believes that the temporary hoarseness immediately after the accident was due to partial paralysis of the vocal cord, and that this may have had some influence in the later carcinomatous development.

"Some time prior to September, 1902, probably in June or July, hoarseness reappeared, and from this time the hoarseness became gradually worse, though it never caused him any dyspnea."

In September, 1902, the patient again consulted Dr. Chas. E. McGirk, who found a marked depression at the site of the old injury, and on October 3, 1902, trephined and removed the depressed bone. Dr. McGirk reports that "the depression extended from before backward and was about 1½ inches in length, the deepest depression being about its middle, and extended over the lower portion of the anterior and posterior central convolutions. The inner surface shows the groove for the middle meningeal artery and also the fractured inner table. The external surface shows a very marked depression of the skull. He was anesthetized with ether and oxygen. He took the anesthetic with great difficulty, and was cyanotic to a greater or less degree during the entire operation." He made an uneventful convalescence; word memory returned in 2 weeks, but his hoarseness remained, as well as soreness, which had become worse within the prior 4 or 5 weeks. Finding that the throat condition was growing worse, with marked dyspnea, Dr. McGirk had him consult Dr. Randall December 4, 1902, and Dr. Randall asked Dr. Freeman to see him. They examined the larynx carefully and determined that "the rough, enlarged left vocal cord extended beyond the middle line and presented outgrowths, which are almost certainly epitheliomatous. There is little evidence of glandular involvement" (Randall). It was impossible to see the anterior portion of the right cord. They advised an operation—a unilateral laryngectomy if this would seem to promise relief, or total laryngectomy should the operation show its necessity.

Dyspnea was a very prominent symptom, and was so great that, as Dr. Randall pointed out, if exposure to the weather or any other cause should produce any slight increase in the obstruction to breathing, an instant tracheotomy would have to be done. This would be extremely difficult. The man weighed nearly 200 pounds, his neck was short and thick and the trachea, of course, was very deeply situated.

First operation, unilateral laryngectomy, December 16, 1902. Drs. McGirk, Randall and Freeman were kindly present. Drs. Stewart and Craig assisted me at the operation, and Dr. Spencer gave the anesthetic. In view of Dr. McGirk's experience with the anesthetic at the former operation and of the existing excessive dyspnea, I feared that a general anesthetic would cause such sudden increase of dyspnea from spasm that instantaneous tracheotomy would be necessary. I decided, therefore, to operate under local anesthesia until I could split the thyroid, and by opening it widely determine whether unilateral or complete laryngectomy would have to be done. This plan was carried out, the patient being in the Trendelenburg position. He suffered but little pain, but as soon as the larynx was widely open began to cough so constantly and violently that it was very difficult to make any accurate observation. Finally, however, we were able to ascertain clearly that the entire left vocal cord was diseased, and that a very small part of the anterior end of the right vocal cord undoubtedly was thickened, and I suspected a beginning disease there. On consultation, however, we deemed that unilateral laryngectomy, together with removal of the anterior end of the right cord, would be a sufficiently radical operation. Accordingly I removed, first, the anterior portion of the right cord without trouble. On attempting to separate the soft parts on the left side of the larynx from the thyroid cartilage, he felt so much pain in spite of the local anesthesia that I decided to give him some chloroform. This was done by means of the von Esmarch mask over the mouth and nose, with an additional piece of gauze over the laryngeal opening. He struggled a great deal. It was impossible to get him quieted with the chloroform sufficiently to go on with the operation without producing such cyanosis as to render Dr. Spencer and myself very anxious. The partial laryngectomy, however, was finally effected under very great difficulties; part of the time he was struggling and part of the time, though quiet, he was cyanotic. I then placed a tracheotomy tube above the cricoid and closed the wound. He made a perfectly smooth and good recovery in spite of the fact that the wound necessarily communicated with the fluids of the mouth. Prior to the operation, and also during convalescence, the mouth, nose and laryngeal wound had been sprayed with hot listerine and boric acid every 2 hours while he was awake. His temperature only rose above 99° for two days, the fourth and fifth, and it reached 99.8° on one occasion only. The tracheotomy tube was removed on the fifth day, and he went home on the seventh day after the operation, the wound being almost healed.

Professor Coplin, to whom the specimens were given for examination, pronounced the disease a squamous epithelioma not only of the left cord, but also beginning to involve the right cord. Naturally, therefore, I looked forward with a great deal of anxiety to his future.

About January 20, 1903, his dyspnea returned and rapidly increased. On the afternoon of February 4 he returned to the city, his dyspnea being so great that his wife was afraid he would die on the train. He was able, however, to wait until February 6, the earliest date at which it was possible for me to do the operation.

Second operation, total laryngectomy, February 6. Anticipating the possibility of an instantaneous tracheotomy, chloroform and oxygen were given him, but not until he was upon the operating table. He was then placed in the Trendelenburg position, and I did a very low tracheotomy, but with a great deal of difficulty, because again, as before, when a moderate amount of chloroform was given he struggled, and when enough was given to keep him quiet he became so cyanosed as to make me very anxious even for his life. As soon as the tracheotomy was done, chloroform was given through a tube which was connected with a long rubber tube and the inhaler (Trendelenburg's apparatus). The larynx was then dissected out, the trachea divided at the first ring below the cricoid, and the entire remaining portion of the laryngeal box was removed. The hemorrhage gave a considerable amount of trouble, but was finally checked. I then sewed the anterior wall of the pharynx to the tissues around the hyoid bone and the upper end of the trachea to the skin. Just as I finished suturing the parts and was ready to close the wound, his pulse suddenly failed and his face became very blue. The operation and the administration of the chloroform were immediately stopped, pure oxygen was administered, 1-20 of a grain of strychnin was given hypodermically, artificial respiration was instituted with rhythmical traction upon the tongue (although I doubted whether, in the absence of the larynx, this would be of any value), the battery was applied over the phrenic. In spite of all this his heart continued to beat much faster and weaker, he became more cyanotic, and in 2 or 3 minutes the heart ceased beating and he was dead. After continuing the above means as nearly as I could judge for 10 minutes, as a last resort I opened the upper abdomen, introduced my hand into the abdominal cavity, and between this hand and the right hand, which made counterpressure on the anterior wall of the chest, I masséd the heart. These efforts were continued for nearly ½ an hour, but without avail.

Examination of the specimen by Professor Coplin and Dr. A. G. Ellis confirmed the diagnosis of epithelioma.

CASE II (IGELSRUD).—*Abdominal hysterectomy; chloroform collapse; massage of the heart; recovery.* Dr. Igelsrud calls attention to the fact that the case is not entirely convincing, for the ordinary means for resuscitation were only tried for 3 to 4 minutes, and also traction on the tongue was employed during massage of the heart. He states, however, his personal belief that the massage of the heart was the most effectual of all the means employed. (He has not given me the date of the operation, but it was prior to 1902, probably in 1901.)

> "A thin, lean, rather cachectic woman, aged 43 years, with carcinoma of the uterus. Total abdominal hysterectomy was performed. When the operation was almost finished the patient passed into collapse; artificial respiration, lowering of the upper portion of the bed, faradization, and the other usual means were used for about 3 to 4 minutes. The heart was then laid bare by a resection of parts of the fourth and fifth ribs. The pericardium was opened and the heart seized between the thumb and fore and middle fingers on the anterior and posterior surfaces. Quite strong and rhythmical pressure was made for about one minute, when the heart began to pulsate of itself. Then observing that the pulsations were becoming weaker, massage of the heart was practiced for about one minute more. From that time the pulse was perceptible and the contractions of the heart became regular. Of course the estimate of time of the various stages is only approximate, as accurate observation of a timepiece is impossible under such circumstances. The patient was discharged from the hospital after 5 weeks."

The physiologists led the way in efforts to reestablish the pulsation of the heart, Schiff in 1874 being the first to succeed by means of rhythmical compression of the ventricles by the hand. At first defibrinated blood was injected, but later various artificial fluids more or less resembling blood in their dissolved salts and specific gravity have given even better results. Finally the addition of 1 per cent. of grapesugar to Locke's fluid was found to be the most desirable means.

The earlier experiments were made upon the heart retained in the body, but later hearts removed from the body even for a long time and even after being frozen were more or less successfully resuscitated. Not only was the effect of filling the heart with fluid tried, but direct massage of that organ was used.

In 1889 Prus, of Lemberg (*Wiener klin. Wochenschrift*, 1900, Nos. 20 and 21), made a new series of experiments upon dogs. He experimented upon forty-four dogs killed by asphyxia, twenty-one by chloroform and thirty-five by electricity. His attempts to resuscitate them were sometimes begun as late as an hour after the heart had ceased to contract. He then seized the heart laid bare *in situ* with the right hand, the thumb being applied on the right ventricle and the other fingers on the left ventricle, when he instituted rhythmical movements. Out of the 100 experiments he was successful in reestablishing contractions of the heart forty-seven times in a wholly normal manner after efforts varying from fifteen seconds to two hours, and eight times incompletely.

In 1900 Batelli (*Jour. de Physiol. et de Path. Gén.*, 1900, *p.* 443) made further studies in the same direction. He was able to recall to life several dogs. Both he and Prus advocated the application of the method to man in case of cardiac arrest from chloroform asphyxia.

Kuliabko (*Arch. Gesammte Physiol.*, 1902, vol. xc, p. 461) established artificial circulation in a rabbit's heart which had been removed from the body. It was kept at a temperature of 40° C. and showed regular contractions. After an hour it was placed in an ice-chest for eighteen hours, when the experiment was repeated, and after less than half a minute the heart recommenced its rhythmical contractions around the openings of the vena cava. In half an hour fairly strong but rhythmical contractions of the right ventricle were observed, but none of the left. In four and a half hours the pulsations ceased. In another case after the heart had been kept twenty-four hours in ice, contractions were reestablished, and in another case after forty-four hours pulsations continued over three hours.

Kuliabko (*Centralblatt für Physiologie,* 1902, vol. xvi, p. 330) also reports that instead of the hearts from healthy animals which had been killed, he took the hearts from rabbits that had died, and even on the second, third and fourth day after death, after a longer or shorter circulation of Locke's fluid, the isolated heart was made to pulsate again and continued to pulsate for several hours. In August, 1902, he tried the same experiment on the heart of a boy three months old who had died from double pneumonia. Twenty hours after death the heart was removed from the body and Locke's fluid was used. For a long time the heart remained still, but finally after about twenty minutes feeble, long, rhythmical contractions of the auricle began, which later extended to the ventricle, and finally the entire heart began to pulsate and continued to do so for over an hour. Later he says that in a number of instances in the human heart as long as thirty hours after death pulsations were produced.

Velich (*Münich. med. Woch.*, Aug. 19, 1903, p. 1421) also placed a heart removed from a dog's body in snow for six hours, and was able to reestablish contractions both in the auricle and ventricle. Again in a heart lying in snow for eighteen hours, and again after being frozen in salt solution for twenty-four hours contractions of the auricle and even slight contractions of the ventricles were reestablished.

Spina, of Prag, according to Velich's very interesting article, proposed a new and apparently less dangerous method, which so far as I know has not been adopted in man. Up to this time most of the attempts had been made by mechanical methods to start contractions of the heart together with various devices for the purpose of filling it. Spina injected into an artery (not a vein), in the direction toward the heart, a considerable quantity of normal salt solution (200 cubic centimeters in a dog) at 35° to 40° C. Just before it reaches the cavity of the heart the fluid closes the aortic valves and finds its way into the coronary arteries, thus stimulating the heart muscle itself. In this way Spina and his pupils in many researches were able almost regularly to revive the action of the heart, both in animals in which the brain and cord had been destroyed and also in animals in which the heart's action had been arrested by poisoning with alcohol or other poisons. In one instance of a dog poisoned with nicotin he states that ten minutes after the heart had remained quiet artificial respiration was begun, and 200 cubic centimeters of normal salt solution with one per cent. of grape-sugar were injected into the femoral artery in the direction of the heart. Even during the injection pulsations of the heart began. These became stronger, until the circulation was reestablished as in a normal animal.

As early as 1896 Velich, and in 1899 Gottlieb and Cleghorn, made experiments with adrenalin.

The latest experimenter in this direction is Crile, of Cleveland, in whose admirable study of "Blood-pressure in Surgery," just published, the results are fully given. He rightly calls attention to the fact that *we cannot expect to restore the apparently dead to life by resuscitation of the heart alone.* Not only must the heart be made to beat, but the respiration must be reestablished and the vasomotor center must be stimulated into renewed activity. To massage of the heart, therefore, we must add artificial respiration and to both of these the means to restore vasomotor activity. These means he has shown by experiment to be infusion of adrenalin in salt solution and the pneumatic rubber suit. By the above means, without the rubber suit, he has repeatedly resuscitated animals whose heart had entirely ceased to beat for fifteen minutes. The pneumatic rubber suit can be inflated at will, and thus the blood pressure be maintained at any given level. He relates several instances in which its use in man during operations seemed to be of great value. The most striking is that of a man with a severe depressed fracture of the skull whose heart had ceased to beat for nine minutes. The heart was restored to rhythmical action with a full radial pulse for thirty-one minutes, and while the bone was being elevated he made voluntary movements of the head. I have had no experience with the pneumatic suit, but through the kindness of Dr. Crile, I show one to you.

As nearly as can be judged, after a résumé of all the cases in which massage of the heart has been employed which I found recorded in surgical literature (for some of the cases are rather vaguely referred to), massage of the heart has been attempted in twenty-seven cases. Of these twenty-four have been failures, and in three (Cases 16, 24 and 27) restoration has followed—a very meagre showing so far, but not a surprising number of failures when the gravity of the condition is considered. In fact the surprising thing is rather that any of them recovered. How far the other means used have been instrumental in recalling them to life—whether these alone would have been sufficient, whether the massage of the heart was essential to their restoration to life—it is difficult, if not impossible, to state with certainty. Moreover, in a few cases success seems to have been so nearly achieved that but little more would have been necessary to turn the balance.

Of one thing I feel assured, that Crile's position is correct when he says that surgeons as well as physiologists so far have fixed their attention too exclusively upon restoring merely the pulsations of the heart. This alone will not reestablish life. The vasomotor and the respiratory centers must be awakened into rhythmical action as well as the blood be started on its vital round before we can hope to recall the apparently—or shall we say really?—dead to life. To accomplish this, massage of the heart, artificial respiration, the infusion of adrenalin in salt solution, and I think very possibly Crile's ingenious pneumatic rubber suit, will all aid.

The methods by which the heart has been made accessible for massage are threefold: (1) By compression between the hands, one being applied outside the chest and the other directly upon the heart after an abdominal section, but without opening the diaphragm. (2) By abdominal section, and after opening the diaphragm seizing the heart within the pericardial sac. (3) By resection of the chest wall, incision of the pericardium, and grasping the heart with one or both hands.

If abdominal section has already been done, the first or second method will usually be adopted, so as to avoid delay and the additional traumatism caused by opening the chest wall. If the operation which is being done does not involve an abdominal section, then an independent quick section is to be made in order to get access to the heart.

Of the successful cases, one of them, Starling and Lane's, (No. 16) was done by this method. In my own case also I practiced the same method, but I must confess that I do not think as a result of this one experience that the heart is so easily seized and manipulated as by either the second or the third method.

In the second method, either a definite incision can be made through the diaphragm to the left of the middle line and posterior to the border of the ribs or, as in Poirier's case, the finger may be thrust through the diaphragm and the aperture enlarged sinply by tearing.

The third method, exposure of the heart by resection of the chest wall, was used successfully in Igelsrud's case although the abdomen was already open. The more usual method of gaining access to the heart is by resection of the third, fourth and fifth ribs. In this particular case I made the incision run parallel to the third and fifth ribs, joining them by a vertical incision along the left border of the sternum. The base or hinge of the flap is external. Different authors have preferred to make the base or hinge above, toward the median line, or below, and to make the flap rectangular or U-shaped. The great advantage of this incision is that the division of the bones can be made next the sternum through the cartilages of the ribs and that a stout pair of scissors enables us to divide the ribs at other points. These instruments would always be in readiness.

The incision proposed by Wehr (*Centralblatt f. Chirurgie,* 1899, Beilage, p. 74), only the fourth and fifth ribs are resected and the base of the flap is on the right border of the sternum. This requires a saw or chisel to divide the sternum. These instruments might very possibly not be provided for the operation in hand, and of course there would be no time to disinfect them if they were not ready.

In any case care must be taken, if possible, to detach the pleura and not open its cavity, as this necessarily complicates the injury very much by adding a pneumothorax and possible collapse of the lung to the already serious condition of the patient. The pericardium is then incised, the heart seized by the hand and rhythmical compression instituted.

The cases of massage of the heart in the literature are shown by the accompanying table:

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DISCUSSION.

DR. CHARLES H. MAYO, of Rochester, Minn.: I am sorry to hear of the 2 cases of death occurring during ether anesthesia. I am willing to have these things occur during chloroform anesthesia because I always expect something to happen then. The cases that occur during the administration of ether, however, must be of the class described; exophthalmic goitre or some other serious condition in which the heart itself may be considered to be involved. I have had no experience with direct compression and massage of the heart as described in the paper. The only cases of death upon the table in our experience have been one of exophthalmic goitre and an abdominal case; but in both cases the anesthesia was produced by chloroform. About 2 weeks ago we had the unfortunate experience of "pumping up," as we used to say in chloroform cases, the first time I have had occasion to resort to restoration of the heart in the last 4 years. I have seen the rubber suit used by Dr. Crile, of Cleveland. In raising the blood pressure it works very successfully. Within the last year I saw Dr. Crile operate for the removal of the Gasserian ganglion and during the operation the blood pressure gradually fell from 166 mm. to 110 mm. Within 5 minutes after starting the inflation of the suit the blood pressure was raised to 139 mm. It seems as if such an apparatus at times would be an important addition to our surgical means of restoration.

DR. E. W. HOLMES: I would like to ask Dr. Keen whether in cases in which this method has been applied the heart stopped in systole or in diastole. As a rule in collapse it ceases in diastole. In that case the heart would respond to massage more readily than in systole. I have in mind the autopsy of a criminal who was electrocuted, the heart being tetanized, as hard as a cricket ball, it would seem to me that if the heart were thus hard and dense, massage would be less effective than in these cases of collapse from ether or chloroform. I am glad to hear Dr. Keen emphasize the fact that other means must not be given up, and that the fault, if there were any fault, was in not persisting in other methods. Otherwise, we might have one more epidemic of rash surgical experimentation, which would add to the already too large mortality in operative cases.

Those of us who have had deaths upon the table, I have had 2, one from chloroform and one from hemorrhage, realize the need of some additional method. We are glad of one thing more, even if it does involve opening the thorax or abdomen and applying the hand directly to the heart; but the method in itself is desperate; should only be used as a last resort; and not to the neglect of less radical means.

DR. H. C. WOOD, JR.: The report of Dr. Keen represents the application to man of a method we frequently use in the laboratory. Great stress should be laid upon the necessity of establishing respiration thoroughly. It must be remembered that the ordinary methods that are used on the operating table for reestablishing the respiration are inadequate. In a dog whose circulation is in good condition it is possible to maintain life indefinitely by the Sylvester method of artificial respiration; but in an animal whose heart has been lamed, by an anesthetic for example, the method frequently fails to save life after the cessation of respiration. Under such circumstances, however, opening the trachea and pumping air in and out of the lungs, by the method commonly known as "forced" artificial respiration, would usually rapidly bring the animal back to life. It must be remembered that the act of respiration has a wider influence than merely moving air in and out of the lungs. By the force of the thoracic pressure the flow of blood through the great veins is encouraged and in the failing heart there is a sort of natural massage of this organ in forced artificial respiration. It is my opinion that a much larger percentage of cases collected by Dr. Keen would have recovered if forced artificial respiration with bellows, for example like those designed by Dr. Fell of Buffalo, had been employed.

DR. MORDECAI PRICE: I have probably seen 10,000 people take ether; many of them so near dead that they were not expected to leave the table, yet I have never seen one die of ether. On the other hand, chloroform does kill. The observer is often mistaken when he says that a patient is dead. I have seen patients in whom I could detect neither breathing nor pulse, begin to breathe comfortably a few moments after the ether was removed. It is my impression that a good many of the resuscitations attributed to various methods are really due to the fact that the patient's heart has not stopped beating. (He referred to such a case.) I am confident that if I got so near death as to require an operation upon my chest and the handling of my heart, I would prefer to die. I am confident, too, that I would avoid the use of chloroform.

DR. W. M. L. COPLIN: I have noted the result of manipulation in the restoration of the heart in the laboratory. A most important point to be considered is the exact manipulation which would yield the best results. The recent studies on the axial alterations in position and relation to other organs would indicate that during filling the heart lengthens. This is shown especially in the filling of the right auricle—one of the first steps in establishing restoration of the heart—as during the flow into this cavity the heart is strongly projected forward and to the left side. Hence massage to fill this cavity should draw the heart in the direction indicated. In massage of the heart this suction action should be borne in mind; in other words, to secure the filling of the heart by direct massage it is necessary to increase the length of the organ by pulling it away from the great vessels at the base. In securing filling of the left auricle a similar line of traction of the heart should be borne in mind. It seems to me that transdiaphragmatic massage would tend to thrust the base of the heart against the more or less firm mediastinal tissues and prevent filling of the auricles. It is, therefore, apparent that the exact technique of massage has not yet been thoroughly evolved.

DR. J. MADISON TAYLOR: It is well known that much can be effected for regulation of cardiac action through mechanical stimulation of the nervous mechanisms of the heart through the cervical sympathetic ganglia, and reflexly through the lower cervical and upper thoracic segments. It scarcely seems necessary to open the chest wall to reach the heart direct; to open the pericardium certainly appears needless. Again by the manipulation of the arms, by upward passive extension, as Dr. Wood remarked by the Sylvester Method, the great veins in the vicinity of the right heart can be relieved, as is taught by the Bad-Neuheim treatment. These possibilities are clearly demonstrated and merely need larger employment to make their value felt. Dr. Holmes' remark about the question of diastolic or systolic arrest shows that in the minds of physicians the possibilities of massage are little understood and less appreciated. Relaxation of a viscus is more readily produced than tonicity. The popular idea of massage is that of mechanically pushing the juices along, whereas it is chiefly an influencing vasotonus through the nervous mechanisms by mechanical stimulation. I should be glad to hear from Dr. Keen precisely what Dr. Crile does in the way of manipulation of animals' hearts.

DR. SWITHIN CHANDLER: I have had the misfortune to see a patient die on the table from chloroform. I would, therefore, like to ask Dr. Keen (1) how long he would wait after apparent death before he would undertake this operation? We have all seen patients who were apparently dead, and we would all think twice before cutting into the chest before it is necessary. (2) What strength of adrenalin he uses, and what method he employs in using the adrenalin-salt solution to obtain the quickest action?

DR. KEEN: Dr. Mayo is right in saying that Dr. Crile's case of restoration from death was under ether anesthesia. In my own case chloroform anesthesia was used from necessity because it was administered by the Trendelenburg apparatus through a very low tracheotomy wound, in order to operate higher up. Chloroform was also used in Igelsrud's case. I quite agree with what has been said by Dr. Price in reference to chloroform being far more dangerous than ether, especially if carelessly administered. In the course of 6 weeks in various European clinics some years ago I saw 6 patients within an ace of death on account of carelessness in the administration of chloroform that we would not tolerate in this country for a moment.

As to the question asked by Dr. Holmes, whether the heart stopped in systole or diastole, I cannot tell. Fairly complete notes of the cases will be published in THE THERAPEUTIC GAZETTE for April 15. I would call attention to the fact that in a number of cases in which dogs were killed, especially by electricity, there was a large number of resuscitations. In these cases, presumably, the heart was stopped in systole. Dr. Wood has properly called attention to the necessity for reestablishing also the integrity of the vasomotor system, and I suppose the best method is by the use of adrenalin. I think that if Dr. Price were in so desperate a condition as to require the opening of his chest and the massage of his heart he would be well satisfied if I succeeded in saving his life, as I should hope in so distinguished a patient, and I am sure his life insurance companies certainly would be. I shall have to refer Dr. Taylor to Dr. Crile's recently published book for the details of the method of manipulation. It is an extremely difficult thing to judge of the exact length of time that elapses before you perceive that a patient cannot be restored by any other than such heroic means as this. One does not look at the watch at such a time, so that a short time may seem very long. I presume that I would not carry on the ordinary means alone, but would be likely to resort to massage of the heart in from 5 minutes to 10 minutes; but, certainly, the earlier it is done after one is certain of the failure of ordinary means, the better it would be. Dr. Stewart tells me that in a notable case, which he has had recently at the Jefferson Hospital, a man stabbed in the heart, who is now getting well, it required only about 2 or 3 minutes to open the chest.

Dr. Crile has already emphasized the fact that the use of adrenalin must be continuous as long as the necessity exists. It will be rarely useful, for example, to give one dose of adrenalin and give no more, because it is quickly eliminated and its effect is evanescent. I am in the habit giving it in the strength of 10 to 30 drops of the 1-1000 solution in a pint of salt solution.

SYMPOSIUM ON SYPHILIS.

[March 9.]

The Cutaneous Manifestations of Syphilis.

BY JAY F. SCHAMBERG, M. D.

Dr. Schamberg illustrated his remarks with lantern slides exhibiting the various forms of syphilides and other eruptions apt to be confounded with them.

The cutaneous manifestations of syphilis possess certain characteristics which make them readily recognizable in the vast majority of cases. In exceptional instances the nature of the disease may be obscured as a result of deviation from the normal types. Error may occur, too, from the protean character of syphilis and its ability to closely simulate nonspecific eruptions. Indeed, so far as cutaneous medicine is concerned, syphilis is the greatest of all imitators. At times this disease may produce eruptions so strongly resembling psoriasis, lupus, epithelioma, eczema, smallpox, etc., that experienced observers may be deceived. Under ordinary circumstances, however, the features of syphilitic dermatoses are clear enough to permit of a positive and unequivocal diagnosis.

As a general rule it may be stated that syphilides do not give rise to *itching*. This assertion will hold good for the vast majority of cases, but it is subject to occasional exceptions. During the rapid evolution of early syphilides some irritation of the skin may be present, but it is slight and usually of short duration. I have, however, occasionally noted severe itching in miliary papular and pustular eruptions which were scaling considerably. The absence of itching is one point in favor of a skin lesion being luetic.

The *color* of syphilitic lesions often aids in the diagnosis. It must be remembered that the characteristic tint is often not observed in the very beginning. Indeed, the early macular and papular eruptions upon their first appearance are often pinkish-red or bright red; soon, however, the vivid redness fades and a dull-red color takes its place. Later on a brownish-red tone is acquired; in some cases the lesions may be raw-ham or copper colored. As the eruption fades out a well-pronounced brownish pigmentation remains. In general terms it may be said that the color of syphilitic eruptions is decidedly less vivid than that of simple dermatoses of the same type.

A common feature of syphilis is the presence upon the skin of a variety of lesions in different stages of development. This *polymorphism* is a feature of considerable diagnostic import. It is due to the slow appearance of the eruption, the different ages of the lesions and the tendency of some to relapse. For instance, papules, pustules, squamous patches and moist papules may be present at the same time.

Some syphilitic eruptions tend to assume a *circular form*: this is particularly true of the small papular lesions and of the recurrent erythematous rashes. The annulopapular syphilide is much more common in negroes than in whites.

The early eruptions, the so-called secondaries, are usually macular, papular or pustular. (The vesicular syphilide is extremely rare.) They are bilateral, generalized over the body, superficial and do not, as a rule, tend to deep destruction. The late or so-called tertiary eruptions are the tubercular, ulcerative or gummatous varieties. They are usually asymmetrical, circumscribed and deep seated with a tendency to deep destruction of the soft tissues. A peculiarity of the tubercular or nodular eruptions is the frequent tendency to form circular, segmented or horseshoe-shaped patches. This configuration often lends material aid in the diagnosis.

Tertiary patches may occur anywhere, but are most commonly seen about the face, on the palms and the soles and occasionally about the elbows and the knees. They pursue an indolent course; often, however, they ulcerate and show but little tendency to spontaneous disappearance.

In the diagnosis of an early syphilitic eruption one may be assisted by attention to the history and the associated manifestations, such as the presence or remains of the initial lesion, generalized glandular enlargement, tonsillar ulceration, mucous patches in the mouth, alopecia, iritis, pains in the muscles, joints or bones, anemia, etc.

In the diagnosis of tertiary lesions one may be aided, apart from the eruption itself, by the history, scars of previous cutaneous outbreaks and evidence of former destructive involvement of the soft palate.

The influence of mercury and the iodids upon the existing lesions is a valuable test in doubtful cases. It must be remembered, however, in the application of the therapeutic test, that these remedies are often of considerable value in certain other dermatoses. Mercury acts most favorably in some cases of lichen planus and the iodids give gratifying results in yeast infection of the skin (blastomycosis), actinomycosis and in some cases of psoriasis.

In the diagnosis of cutaneous syphilis too much stress must not be attached to the presence or the absence of any one feature; the composite symptomatology must be studied and conclusions carefully drawn.

Visceral Syphilis.

BY JOHN M. SWAN, M.D.

In 1894 Musser[1] read a paper before the Association of American Physicians in which he considered the progressive diminution in the number of cases of syphilis and the mild character of the disease. He concluded that tertiary manifestations are not common and that visceral syphilis is rare. He based these conclusions on the statistics of the Philadelphia Hospital and the Presbyterian Hospital. In the latter institution, out of nine thousand cases there are records of two cases of hepatic syphilis and four of laryngopharyngeal syphilis only. I do not include the brain and cord lesions, which will be considered later by Dr. Burr. This rarity of visceral syphilis at the present time would seem to be confirmed by the evidence obtained by consulting the records of the Pathological Society of Philadelphia.[2] Since its foundation in 1857, specimens from only seven cases of visceral syphilis have been shown at its meetings; five cases of syphilis of the liver, one case of syphilis of the kidneys and one case of syphilis of the pancreas. It is apparent, therefore, that one physician will see very few cases of visceral syphilis, even when he has the complete clinical facilities at his command which are offered by our hospitals.

THE LUNGS.—Syphilis of the lung is probably not so rare a condition as might be supposed. According to Aufrecht,[3] pulmonary syphilis may be due to the formation of gummata or to true inflammatory conditions affecting the connective tissue or the parenchyma. The literature of the subject is thoroughly reviewed by the author just mentioned and by Stengel.[4] The studies of the many observers quoted by these writers seem to prove that diffuse pneumonic disease due to syphilis does exist. Whether or not there is a syphilitic disease of the lung that closely resembles tuberculosis in its clinical manifestations there is some difference of opinion. Osler[5] says that if this disease exist, he has no personal knowledge of it. Stengel's review of pulmonary syphilis, however, was prompted by the observation of a case in his wards at the Philadelphia Hospital in which the course of the disease very closely resembled that of pulmonary tuberculosis; and Berg[18] is of the opinion that a syphilitic lesion of the bronchi or the bloodvessels may be the exciting cause of pulmonary tuberculosis. He also believes that pulmonary syphilis complicated by tuberculosis is a more frequent condition than is generally believed. Furthermore, Winfield[21] reported a case of pulmonary syphilis in 1902 that had been diagnosed pulmonary tuberculosis and treated as such by a number of New York physicians. In considering the possibility of such a condition the diagnostician must always bear in mind that a tuberculous patient may become infected with syphilis and that a syphilitic subject may develop tuberculosis, whether or not one disease predisposes to the other. Carlier[6] unhesitatingly says, after a study of seventy-five cases of syphilis of the lung, that the gummatous form of pulmonary syphilis sometimes affects a dangerous resemblance to tuberculosis so that the microscope cannot make a differential diagnosis. The latter portion of this statement may be challenged.

The clinical manifestations of syphilis of the lung are, according to all observers, as a rule, apparent in the right lung and in the middle lobe of that organ. The physical signs are those of a lobar pneumonia or a chronic, fibrous hyperplastic consolidation. They consist of dulness, bronchial breathing, crepitant râles and subcrepitant râles in the interscapular region as far as the base of the right scapula and anteriorly in the second and third right interspaces near the sternum. When, however, the process is one of slow growth of connective tissue of the lung, these signs will not be present over the entire area until late in the course of the disease; so that dulness posteriorly may be accompanied by tympany anteriorly and the breath sounds may be weakened or absent over some part of the affected area.

The symptoms are those of chronic pulmonary disease in general. Cough is usually present, though of variable intensity. Dyspnea is frequently the most marked feature, as in a case of Aufrecht's. There is usually some expectoration, though it may be scanty, microscopic examination of which gives no positive evidence. Cases have been reported in which the sputum contained elastic fibers. Hemorrhage is rare and emaciation is not marked. The writers on this subject differ in their records of the temperature. Stengel published the chart of a patient in the Philadelphia Hospital which shows a marked febrile reaction with a maximum at noon or early in the afternoon.

Probably there is always a more or less well-marked rise of temperature at some stage of the disease.

While the middle lobe of the right lung is the one usually affected by syphilitic disease, areas of consolidation may be found elsewhere. How shall we make a diagnosis in the case of a syphilitic individual who presents the symptoms and signs of pulmonary disease at an apex? Probably the persistent absence of tubercle bacilli from the sputum is the most dependable feature. This fact, in addition to unmistakable evidences of syphilis in organs, such as the liver, the bones or the eye, for which the syphilitic virus has a notable predilection, and an atypical symptomatology will point strongly to syphilis as the cause of the lung disease. It will also indicate antisyphilitic treatment. If, in a suspected case of pulmonary syphilis, mercurial or mixed treatment aggravate the symptoms, the treatment should be immediately discontinued.

THE STOMACH.—Syphilis may produce hemorrhagic erosions, ulcers and tumors in the stomach; it may result in stenosis of the pylorus; it may give rise to a symptom-complex exactly similar to gastralgia (Stockton[12]) and, according to Fenwick,[9] it may set up chronic inflammation of the mucous membrane of the stomach.

Clinically, we may assume that syphilitic disease of the stomach commonly results in a train of symptoms that may be mistaken for gastric carcinoma, gastric ulcer or chronic gastritis.

Syphilitic tumor of the stomach is the result of the development of a gumma in the organ. Einhorn,[7] reported two such cases in 1900 and a third in 1902. The last patient presented signs very suggestive of gastric carcinoma, but the symptoms were relieved and the tumor entirely disappeared on antisyphilitic treatment. In two of Einhorn's cases symptoms of stenosis of the pylorus were encountered which were relieved by the institution of mercurial treatment.

Syphilitic ulcer of the stomach is probably usually the result of the breaking down of a small gumma. The symptoms are those of simple peptic ulcer. Indeed, a patient whose case was reported by Dieulafoy[11] in 1898 had resisted the routine treatment for simple peptic ulcer so long that he was about to be operated on, when the discovery of some old syphilitic cicatrices on his legs determined a trial of mercurial therapy. The institution of subcutaneous injections of mercury biniodid accompanied by potassium iodid was followed by cure. According to Fenwick, who has studied these cases clinically, pain is invariably present, usually in the epigastrium, and appears about one-half hour after taking food. When the disease is advanced, the pain is often most intense during the night and has been mistaken for the pain of a gastric crisis of locomotor ataxia. Vomiting is a conspicuous feature; at first the patient vomits only after his painful attacks, but later, as the accompanying gastritis extends, he may vomit after every meal. Hemorrhage is rare, although in the case reported by Dieulafoy and already referred to, hematemesis was a conspicuous symptom, and in another case of syphilitic gastritis reported by him in 1902 profuse hemorrhages from the stomach were noted. In the early stages of the disease free hydrochloric acid may usually be found after a test meal, and in those cases in which nocturnal attacks of pain are present the vomitus contains an excess of hydrochloric acid. When the disease is advanced, there is usually evidence of lactic acid fermentation. Perforation may occur, as in a case reported by Flexner[10] and one by Caesaris-Demel.[8] Other cases of syphilis of the stomach simulating gastric ulcer have been reported by Einhorn. Flexner, in addition to his own case, collected thirteen cases of gastric syphilis from the literature confirmed by necropsy and histologic studies, and one case of probable gastric syphilis not absolutely proved.

Syphilitic gastritis has been studied by Fenwick, who reaches the conclusion that there can be no doubt that there is such a disorder. The disease presents the ordinary phenomena of chronic gastritis from other causes, but presents the distinguishing feature of intractability to ordinary treatment.

A negro male, aged thirty-nine years, presented himself at the Polyclinic Hospital, October 19, 1903, in the service of Dr. Daland. He complained of pain in the pit of his stomach. He was suffering from an iritis for which he was being treated in Dr. Hansell's clinic. He gave a history of a venereal sore when he was twenty years of age; he was married at the age of twenty-four, and his wife, who had never been delivered of a living child, had had eight or ten miscarriages, usually at about the third month. The pain in the stomach of which this patient complained began about a week before he was first seen.

It was of the nature of a dull, almost constant ache. He was nauseated, but did not vomit. He presented bilateral, painless enlargement of the superficial lymph nodes and signs of consolidation at the right apex. A physical examination of his epigastrium was without result.

At that time I believed that the gastric symptoms and the physical signs in the right lung were due to syphilitic disease of those organs. As the patient had no expectoration, it was impossible to exclude tuberculosis of the lungs. The gastric symptoms, however, rapidly lessened and finally disappeared under mercurial treatment. It seems to me that if this were a case of gastritis in a syphilitic, the mercury would have aggravated the gastric symptoms rather than have relieved them.

In 1901 I saw a child, aged eleven months, the offspring of a syphilitic father. The child was born at term, but had always been sickly. At the age of three months he had an attack which was diagnosed congestion of the lungs, and during his fifth and sixth months he suffered from an attack of infantile scurvy. For a week before I first saw him he had been vomiting, had abdominal pain and was constipated; but this last symptom was soon replaced by diarrhea; there was some fever. The attack resisted the usual measures adopted in treating similar gastrointestinal conditions in improperly fed children until he was put on mercurial treatment, when he improved rapidly. The child had a second attack, similar to the first, about one year later, when mercurials were again followed by relief of the symptoms.

Since my experience with this child, I have seen two cases in the dispensary of the Presbyterian Hospital in which mercurial treatment was followed by marked improvement in the marasmic children of syphilitic parents.

In the diagnosis of syphilitic disease of the stomach we must remember that there is no reason why a syphilitic subject should not have a carcinoma of his stomach, should not have a simple peptic ulcer or that he should not contract a gastritis from some cause independent of his syphilitic disease. In fact, there are in many cases good reasons why a syphilitic should contract gastric inflammatory conditions. After due consideration has been given to the etiologic factors other than the specific disease, gastric syphilis may be diagnosed (1) after demonstrating the existence of a previous syphilitic infection; (2) when there is evidence of tertiary lesions in other organs; (3) by the resistance of the symptoms to ordinary treatment, and (4) by improvement and cure following antisyphilitic treatment.

Dieulafoy says that no one symptom points conclusively to gastric syphilis, but that the symptoms of gastric ulcer in a syphilitic should lead to the supposition that the gastric disease is due to the constitutional disturbance. He also says that one should never forget to search for syphilis in the previous history of a patient presenting the symptoms of simple peptic ulcer.

THE KIDNEYS.—Syphilis sometimes results in the development of gummata in the kidneys during the tertiary stage of the disease. During the secondary stage of the disease cases are occasionally noted in which a true inflammation develops. This inflammation, according to Karvonen,[19] may be (1) an acute syphilitic nephritis; (2) a chronic diffuse nephritis, or (3) a chronic indurative and cicatricial nephritis. These nephritides are marked by the usual signs of renal inflammation; the appearance of albuminuria with hyaline, epithelial and blood casts, fever, edema, anemia, etc.

In a given case of nephritis supposed to be due to syphilis, before a positive diagnosis can be made, the physician should know that the patient was not a subject of renal disease before he acquired his syphilitic infection. The diagnostician ought to be able to show that none of the ordinary etiologic factors of nephritis, such as alcohol, is active in the case under consideration; a requirement that presents great difficulty. The symptoms of renal disease should disappear promptly upon the institution of antisyphilitic treatment. Chauffard and Gouraud[18] hold the view that cases of syphilitic nephritis are characterized by an exceptionally high degree of albuminuria, in their patient fifty-five grams to the liter. Other cases of syphilitic nephritis have also shown a high percentage of albumin: a case reported by Hoffman and Salkowski[14] showed seven per cent. of albumin; one reported by Ferras[15] gave 2.66 per cent. (40 grams in 1500 cc. urine); one reported by Waldvogel[20] gave 9 grams to the liter, 13.5 grams to 1500 cc. and 7.5 grams to 2500 cc. on three different occasions; one reported by Stepler[17] gave 1.2 per cent. of albumin.

In the diagnosis of nephritis due to syphilis, account must be taken of cases in which skin eruptions have been erroneously diagnosed and the energetic administration of mercurials has set up a renal inflammation, as in a case recently studied by the writer [16]. In such cases mercury can be demonstrated in the urine.

THE LIVER.—The liver is probably more frequently the seat of syphilitic lesions than any of the other organs; at least, syphilis of the liver is more frequently diagnosed than syphilis of the other viscera.

From the pathologic viewpoint, the disease may be diffuse (syphilitic cirrhosis) or circumscribed (gumma of the liver).

Clinically, syphilis manifests itself by the production of icterus in the early secondary stage and by the production of cirrhosis and of gummata in the tertiary stage.

The symptoms of syphilitic icterus differ from those of simple catarrhal jaundice by the absence of the accompanying gastrointestinal symptoms, although the stools are, as a rule, clay colored. The usual etiologic factors, such as dietetic errors and exposure to cold, are also absent. The icterus is said by Lancereaux to be due to the pressure of the enlarged lymph nodes at the transverse fissure of the liver on the bile ducts. This view is accepted by Quincke and Hoppe-Seyler.[28] The diagnosis is made by the simultaneous occurrence of the secondary lesions of syphilis, the absence of gastrointestinal symptoms and the influence of antisyphilitic treatment.

The symptoms of syphilitic cirrhosis of the liver differ somewhat from those of alcoholic cirrhosis. According to Marcuse,[22] pain in the hepatic region is the most constant symptom, the liver is usually enlarged, ascites and general anasarca appear, but icterus from compression of the bile ducts is rare. The beginning of the disease is attended by gastrointestinal disturbances in two-thirds of the cases.

The enlargement of the liver in syphilitic cirrhosis seems to be one of the principal diagnostic points, and Osler lays great stress on the extreme irregularity of the organ, as revealed by palpation. A history of syphilitic infection and the existence of syphilitic lesions in other organs will aid the diagnosis.

Gumma of the liver may exist without producing symptoms, but occasionally a superficial gumma may be mistaken for carcinoma of the liver, or a deep gumma may, by its growth, so isolate a portion of the liver substance that a resemblance to malignant disease is produced. Marcuse and Quincke and Hoppe-Seyler claim that the coexistence of splenic enlargement and albuminuria point to gumma; the first writer maintaining that these signs are never found in cases of carcinoma. The patient with syphilitic disease of the liver often has periods of retrogression of symptoms during which he feels comparatively well; but soon the symptoms reappear in force. Such a history is very suggestive of syphilis of the liver. In this as in the other conditions already referred to the history of infection with syphilis and the existence of syphilitic lesions in other organs aid in the diagnosis.

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Syphilis of the Nervous System.

BY CHARLES W. BURR, M. D.

It is impossible in a twenty minute paper to attempt any thorough study of nervous syphilis. All that can be done is to consider a few points in diagnosis and make some remarks on treatment.

There is no symptom or group of symptoms pathognomonic of syphilitic infection of the nervous system. There are groups of symptoms which occur so frequently and are so rarely due to other causes that their presence creates strong presumptive evidence; but the diagnosis can rarely be made with surety of correctness in the absence of other evidence or of the therapeutic test or unless the case be watched for quite a long period. A diagnosis made at the first visit and based on the symptoms then present alone without a knowledge of the past medical history of the patient and the previous course of the disease indicates, as a rule, careless thinking rather than skill. It is often forgotten that syphilis does not protect against other diseases and that because a man has had a chancre it does not necessarily follow that his present trouble is syphilitic.

It is not so much the symptoms themselves that are of value in diagnosis as the way they are grouped together and their course; the way they successively appear. One great characteristic is multiplicity, that is, the appearance of symptoms, it may be almost simultaneously or in rapid or slow succession, which need for their production widely scattered lesions. The morbid anatomy of the disease explains this. It never attacks exclusively one small area of the brain or cord, is never strictly local, but always more or less generalized. Its first gross lesions are always in the bloodvessel walls or in the membranes of the cord and brain. It never attacks one arterial branch to the exclusion of all others, but many at the same time. The disease may progress so rapidly in one spot as to produce such marked local symptoms that others may be overlooked, but if sought for they will be found. This is true even at an apparently early period of the disease, apparently early, only, because symptoms have already appeared of which the patient can have no personal knowledge. For example, it is not infrequent after some sudden and striking brain lesion to find on examination aberrant pupillary reactions or disturbances of the reflexes of the legs which must have antedated the present condition, but which gave the patient no trouble and of which he was ignorant. Though the lesions are always widespread there are particular regions which are apt to be most affected and to cause the first striking symptoms. One of the commonest seats is the membrane at the base of the brain. As a result of this the cranial nerves, especially the motor nerves of the eyes are apt to be affected very early. Given a case of binasal hemianopsia in which the course of the symptoms does not indicate disease of the pituitary body, the most likely cause is a specific meningitis in the region of the optic chiasm. Hemiplegia with oculomotor palsy on the opposite side indicates but does not prove syphilitic disease in the region of the crus. Left sided hemiplegia with aphasia in a right-handed man does not mean that the speech centers are not in the left brain but that there are multiple foci of disease probably syphilitic.

In a strict sense syphilis never attacks exclusively the brain or the cord alone, both are always affected. The morbid process may, however, be so much more severe in one organ as to cause the symptoms referable to the other to be overlooked. The most nearly characteristic type of spinal syphilis is that described by Erb. It begins with a slowly increasing weakness and stiffness of the legs, frequently associated with paresthesias. Vaguely localized girdle sensations are complained of often. There may be hyperesthesia or actual pain in various parts of the body. Serious objective disturbances of sensibility do not occur. Weakness of the detrusor is a frequent bladder symptom. Constipation is frequent, rectal incontinence rare. Progressive sexual weakness often occurs. The final picture is that of a spastic paraplegia. Notwithstanding the spastic gait the muscle tension is low. The kneejerks are increased and ankle clonus is present. Bed sores are rare. Unfortunately this group of symptoms may arise from other causes, and syphilis may cause other symptoms. The safest rule for therapeutic purposes is to regard any case not showing the signs of distinct system disease, but due to a meningomyelitis as specific. It is gravely doubtful if a pure acute myelitis is ever syphilitic. There is, however, a difference of opinion among men competent to judge in this matter.

It is often important to determine the cause of epileptiform convulsions. True idiopathic epilepsy rarely begins after the thirty-fifth year, and given epileptiform convulsions beginning after that age without other symptoms of brain tumor or without some other manifest cause it is best to put the patient to the therapeuic test. The presence of the general symptoms of tumor, headache, vertigo, vomiting and choked disc, does not of course exclude syphilis because a gumma may cause all of them. A syphilitic new growth is, however, apt to have associated with it symptoms due to meningitis or vascular disease in other regions of the brain; whereas in other tumors the symptoms are always, except in the rare cases of multiple growths, referable to disease in one area alone.

A second characteristic of syphilis is the fleeting nature of certain symptoms. Transient palsies, hemiplegic, monoplegic or of the cranial nerves, aphasia and apoplectiform or epileptiform attacks are common. They are most frequently due to variations of the blood supply caused by disease of the vessels, but it is more than probable that sometimes they are the result of a toxin acting locally.

Syphilis may not only produce serious organic disease, but also cause a secondary neurasthenia in the proper sense of that much abused word. At a time when there is no evidence of any organic disease in active progress the patient may show all the signs of profound and apparently causeless neurasthenia. Physical weakness, mental tire, disordered digestion, leaky skin, emaciation, troubled sleep and emotionalism may all be present. The diagnosis cannot be made unless the history is known or there is evidence of an antecedent chancre or some organic manifestation appears. This condition is most apt to occur between the time of the disappearance of the secondary skin lesions and the appearance of tertiary visceral disease. It is important to remember the possibility of its existence when treating young men who, previously robust, have become apparently causelessly weak. As a rule, treatment gives excellent results.

Finally I shall encroach a little on the domain of Dr. Christian and say a few words about therapeutics. Of course the two drugs which have any direct effect upon the specific process are potassium iodid and mercury. It is to be remembered, however, that in cases at all advanced there are present not only the new formed specific granulations, but necrotic, sclerosed or degenerated areas. Treatment will not affect these. Given for example the case of an old hemiplegic with thrombotic softening it is useless to fill him with physic in the hope that absorption will occur and new brain cells be created out of nothingness. Given a sclerosed and atrophied spinal cord, with nerve cells and fibers replaced by dense connective tissue specific treatment will do no good. It may do harm. We all of us have seen old syphilitics suffering, not from any active process, but from the scars of the old disease, improve greatly by being taken off specific treatment and given tonics and food. Mercury and potassium iodid are only of great use during the active period of the disease. The best method of administering mercury is by inunction. I think that for diplomatic reasons it is wiser in private practice to use the ten per cent. oleate than blue ointment. It should be used once or twice daily, a dram each time. I do not think that the gigantic doses of iodid that it is now customary to give do as much good as smaller quantities. A dram a day, given largely diluted with water, is surely enough and often smaller doses are sufficient. If by the end of a month there is no good result, specific treatment ought to be stopped; but if there is any improvement and the patient stands treatment well it should be continued indefinitely. We too often overlook entirely the necessity for general treatment. Syphilitics need food and air and exercise, or if they are bedridden, massage and baths. Iron and arsenic and cod liver oil are of great value.

The Treatment of Syphilis.

BY H. M. CHRISTIAN, M. D.

Syphilis, occurring among the upper and middle classes of our people, in individuals endowed with good health and of fairly good habits, if seen early in the secondary stage of the disease and promptly and properly treated, is, in the great majority of cases, a perfectly curable disease. This is a proposition generally accepted as true at the present day, by those having the widest experience in the treatment of the disease. Equally well recognized is the fact that syphilis occurring among the half-starved and half-washed members of the community and in habitual drunkards, cannot be cured. The same can be said for cases having once developed tertiary lesions. Treatment can cause their disappearance, but cannot now cure the disease. It would seem to the writer as if the time was ripe to call a halt on the spirit of ultra pessimism which has so long possessed the medical profession at large on the subject of the curability of syphilis and which is so largely responsible for the attitude of the laity on the matter, so many of whom upon being told that they have contracted syphilis manifest a keen desire to write their wills and go in search of a revolver. There is, I am sure, in nearly every community of any size in this land, men of business and social prominence occupying positions of trust and honor, who have at one time in their lives contracted syphilis, who have been cured and are the fathers of many healthy children. Granting then that the disease is capable of being cured the first question that naturally arises is, when shall constitutional treatment be instituted. I think that it is pretty generally admitted today that by far the safer plan is to wait for the evolution of cutaneous lesions before beginning constitutional treatment. The reasons for so doing are very obvious to those who have looked at all closely into this subject. In the first place, notwithstanding the parallel column of differential diagnosis between chancre and chancroid given in the text-books, those having the widest experience in the diagnosis and treatment of these conditions will agree with me, I am sure, that in very many, if not a majority of instances, an absolute diagnosis cannot be made. Again it is a well-developed clinical fact that the early administration of mercury does not in any way avert the disease or prevent the appearance of an eruption. It has only been found to modify the character and time of development of the skin manifestations; in other words, the evolution of the constitutional signs of the disease is very materially deranged. One can readily appreciate the hopeless confusion in the mind of the physician who, having mistakenly diagnosed a chancroid as a chancre, has pronounced the patient to have syphilis, has instituted immediate constitutional treatment and subsequently finds that the expected rash fails to materialize. This uncertainty in the mind of the physician is of small moment, however, compared with the impression his recklessly spoken words have made upon the mind of the hapless patient, an impression that no time will ever eradicate. There is nothing to be lost and everything to be gained by waiting six or seven weeks for the natural evolution of the disease. There are, however, some conditions that arise occasionally that call for the early administration of mercury. These are: (1) when the chancre is located on the lip. (2) When from its position it may lead to the infection of others, as on the finger of the surgeon, obstetrician or hospital orderly; or on the nipple of a nursing woman. (3) In those rare instances in which the initial lesion becomes phagadenic and threatens to destroy the prepuce or glans penis. In taking up in detail the consideration of the treatment of secondary syphilis it is well to recognize three types of the disease that are usually encountered: (1) the benign form; (2) the benign form with a tendency to relapse; (3) a severe form of the affection. The particular type which the disease assumes is, of course, as in all infectious diseases, dependent upon the dose of the poison received and the fertility of the soil on which it is deposited, I think that there is little doubt but that the majority of the cases of secondary syphilis seen to-day, at least among the better classes, are of the benign type. Here the macular rash appears at the proper time and is fairly well distributed over the trunk and limbs, rarely on the face. Accompanying the rash there is general adenopathy, with more or less sore throat and some few mucous patches perhaps in the mouth with little if any alopecia. In this type of syphilis it will generally be found that the internal administration of mercury protiodid, one-third of a grain, three times daily, will probably be all that is necessary to bring about a prompt disappearance of the eruption. If, however, this should prove rather slow in fading away a fourth pill can be given at bedtime. As a rule, this is all that is indicated. In these cases the type of the disease is so, comparatively speaking, mild that there is constant danger that the patient, unless warned to the contrary, may break away from all treatment, considering himself as entirely cured, thereby laying the foundation for the development of tertiary lesions at a subsequent time. The second type of the affection is most apt to be found developing in individuals whose general system is somewhat below par, addicted, perhaps, to the excessive use of alcohol and tobacco. In these patients the evolution of the cutaneous lesions is perfectly regular, but it soon becomes manifest that there is a constant tendency to the recurrence of mucous patches on the tongue, lips and buccal mucous membrane. The original erythema is slow to disappear and the papular form of lesion appears very early. Recurrent moist papules about the anus and scrotum are frequently noted. In this variety of syphilis I have found the tonic treatment with mercury so strongly advised by Keyes to be the best. My method in such cases is to instruct the patient to take an extra mercury protiodid pill every other day until the teeth become tender or the gums bleed when lightly touched. The number of pills required to attain this result is divided by two, and the result constitutes the patient's daily tonic dose of mercury. Should there appear at any time during the secondary stage a fresh outbreak of a rash or mucous patches, the patient can be placed temporarily upon his maximum dose, which is of course known.

The third type of secondary syphilis presents a much more different proposition than either of the others just described. In these cases there is preceding the rash a marked leukocytosis with the decided loss of flesh. The appearance of the macular rash is accompanied with all the symptoms of an eruptive fever, headache, rise of temperature and nocturnal osteocopic pains. The erythematous lesions are rapidly followed by the appearance of a widely diffused papular and papulosquamous eruption. It is useless in these cases to lose valuable time in relying solely upon internal medication. Moreover, in the majority of these cases the gastrointestinal tract is so greatly disturbed that mercury given by the mouth will not only not be assimilated, but will greatly aid to increase the gastrointestinal derangement. Mercurial inunctions constitute our only effective weapon in these cases if we wish to gain the mastery over the disease. The preparation most commonly employed is the officinal mercurial ointment, one dram of it being rubbed well in on different parts of the body in succession night and morning. The patient in addition wears constantly an abdominal bandage on the inner side of which is spread a thin layer of the ointment. Mercury vasogen is a rather recent compound which I have used quite a little and have come to believe that it is more rapidly absorbed and therefore more effective in controlling the disease than the older blue ointment.

One great objection to the use of mercurial inunctions is the local dermatitis often produced by their prolonged use. This can generally be avoided if the skin be thoroughly cleaned with green soap and alcohol prior to employing the inunction. Frequent warm salt water baths constitute a most important and valuable adjunct to the treatment by inunction. It is wise at times to omit the inunctions for a day or two, especially if there is noted any tenderness of the gums or soreness of the teeth. When the skin lesions have disappeared and the general condition is good, it is advisable to discontinue the inunctions and place the patient upon the internal use of mercury protiodid.

If subsequently during the secondary stage other manifestations of syphilis appear, another course of inunctions should be pursued.

These three forms are, I think, fairly representative of the types of secondary syphilis as encountered in practice. There is another type, the precocious malignant form, only seen as a rule among the lower classes of the community and where there are poor hygienic surroundings.

There are several preparations of mercury which it might be well to mention, all of which can be employed to great advantage alternately. The protiodid pill of Garnier and Lameureux causes less digestive disturbance, I think, than the American pill; to be sure this may be due to the fact that it is only one-half the quantity. Mercury and chalk, the favorite combination of Jonathan Hutchinson, is a very useful preparation to employ temporarily in cases in which the protiodid causes some diarrhea; but it has always seemed to me as being too attenuated a remedy to be of any real service during the active stage of the disease. Another preparation of mercury recently placed before the profession is mercurol, which I have found very useful to use alternately with the protiodid; administered in one grain doses three or four times daily it will be found very valuable in cases in which the ordinary preparations of mercury cannot be assimilated.

The particular preparation of mercury to be employed during the secondary stage of syphilis is not near so important a matter as is the necessity of impressing upon the patient the fact that, in order to give himself the best chance of making a permanent recovery, a continuous course of treatment for eighteen months will be required. At the outset of treatment the patient's weight is the best criterion as to the action of the remedy upon the disease. If the weight does not increase, or on the other hand gradually decreases, either too much or too little mercury is being administered, or the wrong preparation is being employed.

Too much stress cannot be laid upon the injunction that the patient should be treated as well as the disease. Cod liver oil, iron, quinin and whisky have time and again proven of service, equal almost to that of mercury in the treatment of the early stages of secondary syphilis.

After one and one-half years of active mercurial treatment the patient should be placed upon the mixed treatment usually employed in the tertiary stage of the disease. If there are no tertiary lesions present in the case, the mildest form of mixed treatment is all that is necessary. This can be one-twelfth of a grain of mercury bichlorid, or one-twentieth of a grain of mercury biniodid combined with two to five grains of potassium iodid administered three times daily. This treatment should be kept up steadily for the space of one year. In those cases in which potassium iodid deranges the digestion it can be given alone in milk or the syrup of hydriodic acid in combination with mercury bichlorid can be used. After a year of mixed treatment similar to this, a course of intermittent treatment should be instituted for about six months, at the end of which time, should no lesions appear, all treatment can be safely discontinued.

I want to reiterate my belief that a course of treatment such as just described, if faithfully carried out, will bring about a cure in seventy-five per cent. of cases of syphilis occurring in individuals possessing good general health, good habits and living under proper hygienic conditions. When tertiary lesions have once appeared I do not feel that we are ever justified in promising a permanent cure. All we can expect to do under such circumstances by treatment is to bring about the absorption of the lesions. At the same time, we should insist upon a prolonged continuous course of treatment, with the view of preventing any subsequent return.

In cases of ulcerating tubercular sphilodermata and gummata the best results can be obtained by employing potassium iodid in from ten to twenty grain doses three times daily, together with the use of mercurial inunctions twice daily. Personally, I am thoroughly convinced of the fact that mercury is equally as valuable a remedy in tertiary as in secondary syphilis, and that its use in connection with moderate doses of potassium iodid will be found to prove much more effective than the sole employment of enormous doses of potassium iodid.

DISCUSSION.

DR. ROBERT N. WILLSON: A man has just left the Philadelphia Hospital who for months was looked upon as having a tuberculous process at the base of his right lung. Two weeks before he entered the Hospital he began to expectorate blood mixed with a large quantity of grayish-yellow mucus, and during most of the time he was in the ward he expectorated the same material. No tubercle bacilli were ever found, but large numbers of streptococci and of diplococci were found in this sputum. Dr. Salinger suggested that the mixed treatment be used, but the day before the order was instituted, Dr. Hughes, in his clinic, punctured the pleural cavity, thinking there was fluid present, and opened a small cavity from which he extracted a syringeful of blood. A few days after antisyphilitic treatment was begun all bleeding from the mouth had stopped. The signs of consolidation gradually disappeared and the man left the Hospital with almost complete disappearance of the physical signs previously noted over his lung. The man at no time remembered a cutaneous lesion and would not acknowledge either a chancre or any syphilitic exposure. I always notice that when specialists in genitourinary work or in cutaneous lesions speak of this disease they omit reference to the fact that a case of syphilis may occur without visible early skin lesion. I have often discussed this question with them and have even heard an occasional absolute denial of such a possibility. It is my own belief that cases can occur without early cutaneous lesions. I recently saw a patient who had probably been infected with syphilis last July. At the time I first saw him he had only a profuse purulent discharge from the urethra which was full of gonococci. Months after sore throat developed and continued for a considerable time without treatment. Finally the patient awoke one morning to find that the palms of his hands and the soles of his feet were covered with a pink papulosquamous eruption, the first sign since infection, 6 months before. Dr. Martin felt sure that the eruption was not due to syphilis, but was the result of the use of balsam of copaiba. The patient was treated with this idea for 6 or 8 weeks. But within 2 weeks from the institution of mixed treatment the eruption, the sore throat and the alopecia disappeared, and today he is absolutely free from all symptoms. I would like to ask Dr. Christian whether it has not also been his experience that such cases sometimes occur without any hint at diagnosis in the way of cutaneous lesions.

Dr. A. E. Roussel: About 10 years ago I reported to this Society an interesting case of malignant syphilis that presented unique features, the most important of which was the appearance of a gummatous condition of the hard palate resulting in perforation 10 weeks after the initial sore and while the secondary rash was still in evidence. Another point of interest in connection with this case was the fact that mercury, no matter how administered, internally, hypodermically, by inunction or by fumigation, could not be borne. It was followed by the occurrence of a marked diarrhea and other gastrointestinal symptoms. The case went from bad to worse. Other forms of treatment were tried. The patient subsequently developed a syphilitic boulimia, a syphilitic constriction of the esophagus, and died in a year's time. The point of interest is that the mercury produced the same gastrointestinal symptoms, no matter how administered. It has been my experience, and the teaching of the French authorities, particularly Fournier, that many patients who bear the administration of mercury badly can take large doses for a longer course of time, provided the teeth are first placed in good condition and the mouth is kept clean. In many patients after having been saturated with mercury, the case comes to a standstill. In such cases tonic treatment alone, or perhaps a cessation of all therapeutic treatment and the adoption of hygienic measures produces the best results. In many instances the cases that have shown mild secondary eruptions are those that show a larger relative proportion of marked tertiary lesions. This is doubtless due to the fact that these patients do not remain under treatment a sufficiently long time for the proper elimination of the poison. Some of the older authorities say that the late eruptions are followed by severe tertiary lesions, irrespective of the treatment. The lack of treatment is probably a better reason for these particular occurrences.

Dr. E. Hollingsworth Siter: I recall a case of gumma of both testicles, in which a diagnosis of tuberculosis of both testicles had been made after the patient had responded to the tuberculin test. Castration was to have been done the next day. I told the physician in charge that I knew that the patient had an old syphilitic history and that it might possibly be well to try some mixed treatment first. The man responded to treatment and the gumma almost disappeared. I have recently seen a number of cases in which the eruption of scabies has been mistaken for that of syphilis. The principal reason for the error in diagnosis is the absence of burrows in the webs of the fingers. I have seen a number of cases of scabies without burrows between the fingers, although I believe that is stated to be a diagnostic sign.

DR. R. O. KEVIN: About one year ago I had a case of syphilis in which liver symptoms, such as have been mentioned, developed. I have seen a good deal of syphilis, but this is the only case of liver syphilis in private practice that has come under my notice. During the attack my patient developed marked jaundice, despite large doses of mercury, administered through all the recognized channels, nor was potassium iodid of any service: my patient perished. Marshall, of Dublin, was the first physician, I believe, to use potassium iodid in the tertiary lesions of syphilis, in 1822. Whitla, of Belfast, first pointed out the importance of watching the body weight referred to by Dr. Christian. Hypodermically I have found gray oil in late syphilis of great value, while at the same time iodid may be given internally. I agree with Dr. Christian that very large doses of iodid are not indicated and sometimes do more harm than good. Dr. Amilon, of this city, has recently introduced a method of treatment, that of Professor Möller, of Stockholm, The preparation he employs is a mixture or amalgam of mercury, aluminum magnesium and almond oil introduced into the circulation hypodermically. Dr. Amilon plunges the needle, which is over 2 inches long, straight into the gluteal muscles. He then withdraws the syringe, leaving the needle *in situ*, sees that no blood comes out of the needle, readjusts his syringe and injects the mercurial preparation. I have seen the eruption of secondary syphilis disappear more rapidly from this method of treatment than from any other. Möller's method is at present being largely used in Professor Horwitz's clinic at the Jefferson Hospital in tertiary syphilis, and I believe the profession will hear more of it later on. Möller does not think so favorably of mercurial inunctions as some of the rest of us. It has been pretty well proven that relapses are less frequent after inunctions than after the usual method of administering mercury. Fournier's method consists in administering mercury during 3 or 4 years after the chancre but at increasing intervals; during the intervals of mercurial treatment he gives iodid. Neisser, on the contrary, prefers frictions and injections. Blaschko, in the *Berliner klinische Wochenschrift*, states that cases improve more readily when there is increased muscular action, such as riding, rowing, hot baths, etc., etc. At the present time I have a patient who has a rather obstinate case of syphilis. The man has had charge of the cold storage department of a large hotel in this city. I advised him to change his occupation, and he is now a cook. He sweats profusely, he tells me, and his case has improved very much since he began his new employment.

DR. J. F. E. COLGAN: Professor DaCosta on one occasion had a patient in clinic in whom the dianosis lay between gumma of the lung and tuberculosis. It was finally decided that there was gumma of the lung.

DR. ERNEST LAPLACE: There are a great many patients who have syphilis and who are apparently cured, but in whom the slightest traumatism will call into existence some manifestation of the disease. By traumatism I mean a slight spontaneous injury or an injury inflicted by the surgeon in the performance of a necessary surgical operation. The manifestations of syphilis under these circumstances are most protean; for example, a tumor may follow such a traumatism, which may resemble an epithelioma, or there may be proliferation of fibrous tissue, behind the peritoneum for example, simulating a retroperitoneal sarcoma to such an extent that it may be pronounced inoperable. If treated with antisyphilitic remedies such a growth will disappear. In a case in which syphilis has been apparently cured, a wound which ought to do well will suddenly take a queer turn, a grayish slough will appear and continue, until by examination some old traces of syphilis are discovered, which will indicate the proper method for the healthy restoration of that wound, careful specific treatment.

DR. A. A. ESHNER: One occasionally sees cases of suspected syphilis, in which, if there have been cutaneous manifestations, they have been overlooked on the part of the patient, and one naturally remains in doubt whether or not he shall institute treatment. It has seemed to me, as Dr. Willson has indicated, that occasionally there may be cases of syphilis in which cutaneous manifestations do not appear; but in which, after the lapse of a considerable interval of time, the gravest symptoms of syphilis arise. It is on this account that I have sometimes raised the question whether in cases in which the history, the primary lesion and the attendant circumstances render a diagnosis of syphilis as nearly as possible positive, it would not be better to begin the administration of mercury at once, without waiting for the appearance of cutaneous manifestations that may never appear, until the patient is overwhelmed by the development of grave nervous and perhaps other visceral lesions.

DR. SCHAMBERG: The queries of Dr. Willson and Dr. Eshner recall to my mind a sergeant in the army whom I saw about 2 years with a syphiloderm upon the palms of his hands. He was an intelligent man of careful bodily habits, but never knew of any manifestation upon the skin antecedent to the palmar eruption. I believe that in unusual instances the secondary roseola may be so slight as not to be visible except upon close inspection in proper light. While the eruption is commonly overlooked and not noticed, I believe it possible in rare cases for it to be clinically absent. I believe that Dr. Christian's proposition not to begin treatment before the appearance of the secondary eruption is really a safe one. However, theoretically, this is not a good plan, and I believe when the diagnosis can be firmly established before the appearance of the eruption it is advisable to begin the treatment as soon as the diagnosis is made. In one of my patients in whom the diagnosis was made from the presence of an initial lesion of sclerotic hardness, an indurated lymphangitis and enlargement of the neighboring lymphatic glands, the institution of vigorous mercurial inunctions prevented the oncoming symptoms, and the man never had a cutaneous outbreak, although he was under daily inspection for a long time. He did some months later have ulceration of the tonsils and of the posterior pharyngeal wall. During the time that we are waiting for the secondary eruption to appear there is doubtless a proliferation of the germ of syphilis and an increased production of toxins in the system with the production of noxious effects upon the tissues generally. In no other disease do we wait for such a condition of affairs if it is possible to diagnose and treat it before that time. I believe with Dr. Christian that it is undesirable to begin constitutional treatment if there is any doubt as to diagnosis existing in the mind of the physician, and furthermore, that, as a rule, the diagnosis is not perfectly clear until the secondaries appear. There is nothing so destructive to the carrying out of a proper treatment as uncertainty. The comparative merits of the various methods of treatment of syphilis need not be long considered. That which is desired is the introduction of a certain amount of mercury into the blood. It matters not by what channel it is introduced so long as it gets there. It may be given by the mouth, by hypodermic injection, by inunction or by inhalation. The point to remember is that mercury in the gastrointestinal tract or in an insoluble form beneath the skin is, properly speaking, not in the system. When mercury produces a diarrhea the patient is absorbing very little of the drug. The dose is largely a matter of individuality, as with all drugs. I believe there is no better method than that of carefully carried out mercurial inunctions. But that term, carefully carried out mercurial inunctions, means much. It does not indicate merely rubbing on to the skin a certain amount of mercury. The inunction can best be done by a second person. When a patient can afford it, I usually have a masseur rub the ointment into the skin, preferably over the back. In some cases the rubbing is continued for an hour. The dose of mercury and the duration of the inunction depend upon the effect. In dealing with obstinate, late syphilitic manifestations of the skin it is my rule to make an impression either upon the disease or the patient. If the disease fails to yield and the patient shows no effect of the drug, the drug must either be increased or the duration of the inunction prolonged. In the use of mercurial inunctions it is advisable to dilute the ointment with lanolin, first—because this is a most absorbable ointment base and probably increases the absorbability of the mercury; and second, because it lessens the irritant effect of the mercurial ointment upon the skin. I have had some experience with the hypodermic treatment of syphilis. The soluble preparations appear to me to be preferable and I usually employ mercury bichlorid. In a series of 350 injections I have been fortunate not to have produced an abscess, although I have frequently seen localized indurations result. I believe that the hypodermic treatment is to be reserved for special indications and should not be used as a routine measure. In one patient in whom I employed injections of mercury no other method was available. Mercury by mouth in sufficient dosage could not be tolerated and inunctions invariably produced a dermatitis.

DR. CHRISTIAN: The point brought out by Dr. Roussel is one that I endeavored to emphasize in my paper, i. e., that the patient is always to be treated as well as the disease, and that during the treatment of a case of syphilis it is often advisable to suspend specific treatment temporarily. Cases of precocious malignant syphilis are fortunately rare, and are encountered, as a rule, only in dispensary practice. In these cases tertiary ulcerative lesions appear within the first few months, and there is always marked cachexia with emaciation. Another question that always enters my mind when discussing syphilis is whether we are always justified in jumping at the conclusion that because some obscure condition or certain local lesions are benefited or cured by the administration of mercury and potassium iodid, that, therefore, the patient must have syphilis. This is a time-honored tradition, I know, and is still taught and practiced; but I have never been able to entirely satisfy my own mind on the matter and often wonder whether it is not perfectly possible for these drugs to cure something else than syphilis.

A Case of Primary Typhoid Cholecystitis with Calculi.

BY FRANCIS T. STEWART, M. D.

[Read March 23.]

Although the condition has not attracted much attention until recently, cholecystitis occurring as a complication of typhoid fever was recognized by Louis.[1] It is probable that the bacillus of Eberth lodges in the gall bladder in the large majority of the cases of typhoid; in sixty-six autopsies of typhoid patients the bacilli were found in the gall bladder in forty-seven.[2] It is not very unusual to find tenderness in the right hypochondrium during an attack of typhoid; less commonly a distinct swelling of the gall bladder may be felt. Most of these cases subside without surgical treatment. As with the appendix, within whose lumen bacteria perpetually dwell, so with the gall bladder, the presence of infectious organisms alone is not sufficient to give rise to serious trouble; there must be irritation from concretions or lack of proper drainage. Indeed the bacillus typhosus may reside in the gall bladder for years without causing symptoms. In Miller's[3] case the germ was recovered from the bile seven years after an attack of typhoid fever, Dungern[4] isolated it after fourteen years, Droba[5] obtained it after seventeen years, and Hunner[6] found it eighteen years after the primary infection. In cases of this sort the possibility of reinfection should be considered.

The relation of the clumped bacilli to cholelithiasis has been pointed out repeatedly. Although physiologists insist on its antiseptic properties, Fränkel, Krause,[7] Miyaki[8] and others have cultivated both the colon and the typhoid bacillus in the normal bile. It is probable that the bacilli enter the portal circulation from the intestine and are eliminated by the bile, thus gaining entrance to the gall bladder. Direct infection from the intestine by way of the chloedochus and cysticus is possible, but in such an event the bacilli would have to fight their way up stream and would probably be contaminated with other microorganisms. The original demonstration of the possible pyogenic nature of the bacillus typhosus was made in 1887 by Fränkel,[9] who obtained it in pure culture from a peritoneal abscess. Gilbert and Girode,[15] in 1890, were the first to prove that it may produce suppurative cholecystitis. That the bacillus typhosus may cause a suppurative inflammation of the gall bladder in a patient who has never had typhoid fever has been noted only recently. In Medicine, October, 1903, Burley reports a case and gives a table of six other cases which he has collected from the literature; Richardson,[11] Cushing,[1] Pratt,[2] (two cases), Mitchell,[18] Stockton and Lyte.[18] I am indebted to Dr. Robert G. Le Conte for the privilege of operating upon and reporting the following case:

The patient, a woman, aged 26 years, was operated upon August 10, 1903, in the Pennsylvania Hospital. She had had three children, the last two years before admission. Her health had always been good up until ten years ago, when she experienced her first attack of gall stone colic. These attacks have recurred with increasing frequency until the time of operation. There is no history of typhoid nor of any disease resembling typhoid. For three weeks before operation she was intensely jaundiced. On admission to the hospital the temperature was 101° F., and the pulse 100: there were tenderness and a slight fulness to palpation. The rest of the abdomen was negative. Although the patient was deeply jaundiced the blood coagulated in one minute. The gall bladder was exposed by a longitudinal incision through the right rectus: it was elongated, thickened, sacculated near the duct and surrounded by a few recent adhesions. The distended fundus presented through the convex surface of the liver just above its margin and was opened at this point, giving exit to a small quantity of clear fluid and then a large quantity of sand and greenish-yellow pus. A stone about ¾ inch in diameter was removed from the sacculation near the cystic duct. Although no stone could be felt in the common duct, it was incised and a probe passed up into the hepatic duct and down into the duodenum without revealing any obstruction. The gall bladder was sutured to the abdominal wall with catgut and a gauze drain passed down to the opening in the common duct. The patient made an uneventful recovery. The pus from the gall bladder gave a pure culture of the bacillus typhosus, as is shown in the following report made by Dr. Longcope.

Cultures from gall bladder made at operation. Two agar slants. After twenty-four hours incubation at 36.5° C. both show a growth of several delicate, gray, semi-translucent, small, raised colonies. All the colonies prove to be of the same variety. The organism is a delicate, actively motile bacillus which stains slightly irregularly with aniline dyes and decolorizes by Gran's method. It grows delicately on agar, does not produce gas in glucose media, clouds bouillon diffusely but does not form a pellicle, produces a faint cream-colored moist growth on potato, acidifies milk very slightly after twenty-four hours, but causes no frothy change after a week's growth. It does not liquefy gelatin. Positive agglutination was obtained in forty-five minutes with a 1-100 dilution of known typhoid serum. After receiving the above report some of the patient's blood was sent to the laboratory for the Widal test with a positive result.

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DISCUSSION.

DR. JOHN H. MUSSER: I want to call attention to the very great importance of the clinical relation between typhoid fever and cholecystitis. This etiologic relationship has never been fully impressed upon the profession until the last 3 or 4 years. A paper which I am about to publish includes 160 such cases of cholecystitis. When we have infections around and about the gall bladder giving rise to lesions, the symptoms of which are more prominent 2 or 3 years after the attack of typhoid fever. I attempted to call attention last year in the Congress of Physicians and Surgeons to the fact that many cases of so-called relapse in typhoid fever are really cases of cholecystitis following typhoid fever. I was much interested to find, on my return, 2 cases in my wards illustrating the point and subsequently seeing a number of cases during the winter that I considered to be relapses of typhoid fever, but which were cases of prolonged typhoid fever due to cholecystitis and not to the typhoid process. They were not recognized, because of the position of the liver, high up with the gall bladder somewhat hidden by the ribs. The patient being in a toxic state did not give expression to pain. This was borne out by a case which I saw some time ago in a nearby town of ceaseless vomiting of unknown origin. I went over the case with the attending physician and found from the history that the patient had had typhoid fever. About the time of the decline of the fever, at the end of the third week, the time when cholecystitis usually is shown, the patient had recurrence of chill followed by high temperature during which she nearly died. Four or 5 days after the temperature became normal this unusual vomiting arose. After careful consideration of the case I felt, basing it more particularly upon the knowledge of the fact of the etiologic relationship of typhoid fever and cholecystitis, that the patient had cholecystitis, that there was a pericholecystitis, that adhesions had formed and that there was a gradual obstruction about the pylorus giving rise to the obstinate vomiting. We considered that the vomiting might have been due to a paresis of the stomach, because of thrombosis of internal veins, there having been a thrombosis of the left femoral vein. The symptoms were so urgent, and the family and physician agreeing, an exploratory operation was made. Dr. Clark operated and found 8 gall stones in an enlarged and inflamed gall bladder which was adherent to the pylorus, occluding the duodenum. There were also adhesions between the gall bladder and the colon. The patient was relieved at once by the removal of adhesions, but the vomiting recurred on the fourth or fifth day after operation and the patient succumbed. At the time of operation there was noted an area of paleness which seemed to indicate that this area of the stomach was the seat of anemia and consequent paresis from an obstructed vein. We had to do then with cholecystitis, pericholecystitis, adhesions and paresis due to secondary thrombosis of the veins distributed to the stomach. I saw a second case 5 weeks ago. The patient had had typhoid fever 3 years ago and, following the attack of typhoid fever, a prolonged period of slow and uncertain convalescence during which there was abdominal pain. The pain persisted after full convalescence and her story from that time to the present has been one of recurring attacks of alleged gastritis with pain. When I saw her these attacks occurred every other day, 4 or 5 times a week. While the symptoms simulated those of gall stones they were relieved by simple measures. They were never attended by jaundice and the pain was not in the region of the gall bladder; always in the region of the epigastrium. Because of the short duration of the attacks we thought we did not have to do with a case of cholelithiasis, but of cholecystitis with pericholecystitis. Dr. Martin operated. Not only was there cholecystitis, but the most extraordinary adhesions around the gall bladder and surrounding the duodenum, occupying, to a moderate degree, the pyloric orifice of the stomach. In addition to this there was a large fibrous mass and enlarged lymph glands. The operation was done 5 weeks ago. There has been no recurrence of pain. Microscopical examination showed the thickened walls of the gall bladder and the large thick adhesions to be simply of inflammatory origin. The gland itself was the seat of chronic inflammation.

DR. COPLIN: It is generally conceded that when the typhoid bacillus reaches the gall bladder it induces an inflammatory process with more or less desquamation of the lining epithelium. The presence of agglutinins in the bile or the exudate causes massing of the suspended matter in the cystic contents, thereby forming a nucleus or nuclei, upon which may be built one or more concretions. In other cases, instead of getting a single mass by the action of the agglutinins multiple flocculi are formed which may constitute the basis of the so-called biliary sand. Another point is the occurrence of pseudomembranous cholecystitis complicating typhoid fever. I had an opportunity to see one such specimen (post mortem) in which the cystic duct and the lower portion of the gall bladder were rather closely packed with a mass of pseudomembrane. Sections showed that the pseudomembrane had not developed in the duct; therefore, the probability was that it had risen above and become impacted in the duct. In interstitial suppurative cholecystitis the lymphatics of the gall bladder show infection, and there can be seen, under the microscope and sometimes macroscopically, lines of suppuration traversing the gall bladder and often without pus collection in the interior of the gall bladder and without general inflammation of the peritoneum; but causing considerable pericholecystitis of the kind mentioned by Dr. Musser. In regard to the infection of the gall bladder bacteriologists are not agreed. Experimental studies have not yielded uniform results. Some have injected typhoid bacilli into the portal circulation and failed to find bacilli in the bile collected from the common duct; others, by the same method, have obtained the injected organisms from the bile. The ability of bacteria to pass from the vessels to the biliary channels is probably influenced, to a large degree, by the height of tension in the bloodvessels and bile canaliculi and the presence of minor lesions in the hepatic parenchyma. Under favorable conditions a leak occurs and bacilli enter the primitive canaliculi and appear to be secreted by the liver; but I am not by any means strongly inclined to the belief that the bacilli can be secreted by the normal liver. I think the majority of the cases are ascending infections. Dr. Funke has been doing some good work on this problem, in the speaker's laboratory, but the results were not as yet available for citation. We are becoming more and more familiar with the multiplicity of lesions produced by the typhoid bacillus. That it should produce a primary cholecystitis would be the source of less surprise at present than formerly.

DR. CHARLES H. MAYO, of Rochester, Minn.: I recall 3 cases in which we obtained a pure culture of the typhoid bacillus from pus in the gall bladder. In all these cases there was a history of typhoid fever within from 3 to 4 months of the time of the operation. There are three avenues by which microorganisms may reach the liver; (1) through the portal circulation, (2) by ascending through the common duct, and (3) through the lymphatic system. In the cases that we have attempted to explain it seems that the lymphatic system is at fault by carrying the infection to the blood. Then the liver, in its effort to eliminate the infection, may allow some of the organisms to locate; so that a single infective focus or a group of infective foci will be produced which are capable of inoculating the gall bladder, if the resistance of that organ is reduced by a stone. It is probable that stones are all formed at one time; that they are not formed by continuous accretions. When stones are formed it is probable that the process is similar to the congealing of ice at one particular period. The question of the liver and the kidneys in the excretion of poisons is most interesting when considered from the viewpoint of inflammation of the lymphatic system. Leukocytosis is an indication of how much the lymphatic system and the glands intervene between the source of infection and the venous system; the liver would be the last resort in the removal of an infection. All the glands that have ducts have a poor internal lymphatic system; the ductless glands, on the other hand, all have a very extensive internal lymphatic system. The liver and the kidney, both being deficient in lymphatics, are liable to be unprepared to take care of the pus, should an abscess develop in its substance. If the abscess is single and is situated in the interior of the organ, where there are no lymph areas, it will become chronic and eventually sterile, thus producing a type favorable for operation. Multiple abscesses, on the other hand, are often connected with veins, and then we see recurring chills, which is the symptom indicating venous poisoning.

DR. DEAVER: In several cases Müller has been able to isolate the typhoid bacillus from cases of gall bladder disease and from gall stones. I scarcely ever operate for cholecystitis that I do not see enlargement of the lymphatic glands as well as meet with adhesions.

PROCEEDINGS

OF THE

Philadelphia County Medical Society.

Infection in the Upper Abdomen: Probably an Abscess of the Liver of Amebic Origin.

By John H. Musser, M. D., and De Forest Willard, M. D.

[Read March 23.]

Medical Aspect. While the broad features presented suggest that the case herewith reported is one of amebic abscess of the liver, the surgical findings and some of the subsequent investigations make me hesitate, so that I do not wish to go on record as calling this a case of that character. I should prefer, if Dr. Willard will agree with me, to call the case one of infection in the upper abdomen. Briefly, the features which suggest amebic abscess of the liver are as follows: A patient, fifty-five years of age, had been staying for the time at Atlantic City. She had been perfectly well throughout the summer. She suffered, August 24, after dietetic errors, from acute gastroenteritis. The gastritis subsided, but the enteritis continued. There was colitis, characterized by bloody and mucous discharges, and the usual general features, with continued, but not very high, temperature. I saw her about the fifteenth of September, about three weeks after the beginning of the attack, in what was practically called a relapse. At this time I noted nothing unusual, except that the abdomen was more distended, and particularly the upper abdomen was more tympanitic than in an ordinary case of colitis. The patient continued improving from this time, save that she had two or three attacks of faintness and vertigo, which alarmed the family, and they had her removed to Philadelphia under my care in the Presbyterian Hospital. She was admitted to the hospital on the twenty-sixth of September, without fever. I saw her on the twenty-seventh, and found that she had a tender mass in the upper abdomen continuous with the liver and extending about to the umbilicus in the median line, the shape of which conformed to that of the left lobe of the liver. There was apparently an infection present and, in view of the previous gastro-intestinal attack, I thought we had to do with abscess of the liver.

The stools of this declining attack were examined in accordance with the usual methods, and ameba-like bodies were found. They were not living and, therefore, I hesitate to say that the case was one of amebic dysentery. Large masses of protoplasm which were not leukocytes were found, but they were not living masses, possibly because of the declining stage of the disease.

The following day the patient was seen by me with Drs. Willard, Mayo and Ochsner. We all agreed that there was infection in the upper abdominal cavity and that operation was required because of the local conditions and because the patient showed signs of toxemia, if not of septicemia, characterized by rapid pulse, anemia, prostration, vertigo and nausea.

The fluid that was removed at the operation had a specific gravity of 1012; was chocolate-colored, was only slightly, if at all, purulent, having 4.4 per cent. of albumin. No pancreatic ferments were found. Microscopically, a little blood, no pus, some fat, no bacteria. The fluid was sterile. Examination of the stools after operation or during convalescence showed no amebæ. Examinations of the clots removed at the operation were negative as to presence of amebæ. During the time the patient was under observation before operation in two days the leukocytes rose from 14,000 to 22,000, declining after operation. Temperature after operation rose to 101° for forty-eight hours; subsequently it fell to normal. There was no response at any time to agglutination tests with cultures of bacillus of Shiga or of Eberth.

There was one feature I want to call attention to, the occurrence of the vertigo and the attacks of moderate collapse, which I believe now were due to the fact that the heart was displaced upward, possibly by the large collection in the upper abdominal cavity. Recovery was without event.

The occurrence of an abscess in the liver apparently, in a patient with coexisting colitis, even in this climate, suggests an amebic origin. When with this we note an absence of fever the suspicion is confirmed, especially as ameba-like masses were found in the stools. The findings of the surgeon, not as definite as we might wish owing to the exigencies of the operation, the peculiar nature of the fluid removed and the old clots suggest strongly a pancreatic origin for the accumulation. Even the absence of pancreatic ferments does not contradict this, as it has been shown that this property is lost in old cases of pancreatic cyst.

SURGICAL ASPECT. The patient was first seen by me September 29, in consultation with Dr. Musser. The swelling appeared in the right side of the epigastrium on the previous day; the tumor was semifluctuating; tender upon pressure, with pain extending to the right over the whole area of the liver. The character of the pain was aching rather than intense suffering. Hemoglobin, 60 per cent.; erythrocytes, 2,745,000; leukocytes varying from 14,700 to 22,000.

On account of danger of rupture of the abscess into the peritoneal cavity, immediate operation was undertaken, Dr. Mayo kindly assisting. Upon opening the peritoneum it was found that no adhesions had yet taken place between the two layers ; consequently, careful circumferential packing was introduced. Examination of both lobes of the liver failed to discover an abscess pointing upon the outer surface. Beneath the liver in the gastrohepatic space a large elastic tumor presented, suggesting a cyst of the pancreas. Upon opening this, one-half pint of greenish-yellow fluid was evacuated, at first of thin consistency, later of thicker and more glutinous character and finally, masses of dark tissue, broken-down liver substance and partially organized coagula were discovered. There was a large mass of semisolid consistency in the cavity, which it was deemed unwise to detach with the fingers lest hemorrhage result. The peritoneal cavity having been separated by packing, the walls of the abscess were sutured to the muscles and aponeuroses. A large rubber tube was inserted to the bottom of the cavity, together with strips of gauze. The laboratory findings previous to operation have already been referred to.

On October 3, examination of the stools showed no ameba coli. On October 4, agglutination test with the bacillus of dysentery in 1 : 20 dilution, negative; in 1 : 50 dilution, negative. Gastric contents: Total amount, 58 cc.; total free HCl, 0.4 cc. $\frac{n}{10}$ NaOH Sol. = 0.014584 per cent.; total acidity, 1.8 cc. $\frac{n}{10}$ NaOH Sol.; lactic acid absent; sarcinæ absent.

As the patient vomited, the circumferential packing was removed on the fourth day, because it was thought possible that its pressure upon the stomach was acting as an irritant. The peritoneal cavity was quickly blocked off and never became infected. Drainage from the abscess cavity was removed on the seventh day and fresh gauze inserted; the masses within the sac separated and came away as sloughs.

October 5, hemoglobin, 75 per cent.; erythrocytes, 4,238,000; leukocytes, 14,900. October 7, leukocytes, 13,400. October 9, bile test negative. October 30, hemoglobin, 52 per cent.; erythrocytes, 2,976,000; leukocytes, 8,500. Closure of the cavity, which was six inches in depth, was slow, but complete and permanent.

Amebic liver abscess in temperate regions is only found about once in 100 to 125 autopsies. In the tropical zone, the condition is a frequent one, since the ameba coli is much more commonly present, and passive congestion of the liver is a predisposing cause of suppuration. The bad habits of eating, living and drinking with lack of exercise also contribute to the causation.

Our patient had not been out of Philadelphia except to the seashore. There had been no injury, no echinococci were present, nor were round worms, liver flukes or the balantidium coli found. According to Kieffer (*Phil. Med. Jour.*, February 21, 1903), 20 to 25 per cent. of cases of severe amebic dysentery in tropical countries eventuate in liver abscess, and 85 per cent. of tropical liver abscess cases are due to infection by the ameba coli. The abscess may develop quickly, or may even be delayed for a year or more. While our case did not present the typical liver pus, was not as reddish-brown as usual, yet the indications point to abscess of this organ, although since the patient lived it is impossible to verify the location absolutely. At the time of the operation and subsequently, opinions were divided as to whether the liver or the pancreas was the seat of the disease. The patient presented, however, the usual symptoms of fever, enlargement of the liver, pain, pallor rather than jaundice, with tendency to liver decubitus rather than dorsal. She had not had a chill, but had perspired. At the time of operation, the laboratory report as to the presence of amebæ was considered as definite, but Dr. Steele's subsequent investigations do not seem to be as positive.

A liver abscess which was reached across the pleural cavity by an incision made in the eighth interspace and the resection of a rib, was reported by Dr. Musser and myself[1] several years ago. The two pleural surfaces were sutured together in the shape of a parallelogram around the opening, the diaphragm was then perforated and the abscess in the liver reached and drained.

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[1] Abscess of Liver Following Amebic Dysentery—*Univ. Med. Mag.*, April, 1893.

The Surgical Relation of the Vermiform Appendix to Perforation in Typhoid Fever.

BY LEVI JAY HAMMOND, M.D.

[Read March 23.]

To within a few years, perforation and its well-nigh fatal consequence, perforative peritonitis, occurring in the course of typhoid fever was regarded as a complication, relief of which was beyond possible hope of surgical intervention, until E. Leyden in 1884 (1) recommended it as a rational procedure, likening the condition to suppurative pleuritis. Later in the same year, Mikulicz (2) reported three of his own cases, in addition to reviewing those previously recorded in literature. In 1886 Dr. J. C. Wilson (3) strongly advocated it in terms that compelled the surgeon to no longer delay operative intervention, remarking that "The courage to perform laparotomy at this time will come of the knowledge that the only alternative is the patient's death."

Encouraged by these bold advocates, surgeons throughout the length and breadth of the world have kept literature well sprinkled with reports of operations for this heretofore fatal complication, even in the face of so high mortality as 80.64 per cent. (Keen), 73.78 per cent. (Finney) and 88 per cent. (Monad). Yet when we contrast the mortality of 95 per cent. (Harvey Cushing) in unoperated cases with the above, it gives quite a sufficient margin to encourage the undertaking.

Our efforts will probably not be crowned with greater success until the clinician can determine the time of rupture in a given case, or the preperforative stage as pointed out by Cushing. The greatest possibilities, however, seem to lie in the removal of conditions that would predispose toward perforation.

The prophylaxis, therefore, in perforative peritonitis from typhoid fever, is the pivot upon which every effort should revolve until either the cause is removed or accuracy in diagnosis has enabled the clinician to recognize the preperforative stage, as prompt interference after perforation has taken place has not evidenced any marked lowering in the mortality table, as shown by analysis of cases recorded by Finney, Cushing, Keen and others.

The appendix vermiformis is the seat of perforation in typhoid fever according to Cushing in 9.6 per cent. of cases of perforation;

according to Fitz in 3 per cent. of 167 cases; according to Hopfenhausen in 7 per cent. of 108 cases.

According to Osler, Fitz, Murchison and others, perforation occurs in 3 per cent. of all cases of typhoid fever. It is the cause of death in from 6 to 7 per cent. of all fatal cases. The ileum, according to Finney, is the seat of perforation in 80 per cent., large intestine in 12 per cent. and the appendix in 5 per cent.

It is especially in this 5 per cent. of appendiceal perforations in typhoid fever that the author is concerned; first, because of the belief that in addition to the 5 per cent. of perforations in typhoid cases arising from the appendix alone, there is a large number of cases of perforation occurring in the ileum and ascending colon that can be directly traced to preexisting disease of the vermiform appendix, and in support of this belief, the following cases seem to bear witness:—

CASE 1. (March, 1903.) A female, aged 26 years, a member of a religious order, had been stricken with typhoid fever 2 weeks before symptoms of perforation of the bowel presented themselves to her attending physician. There had been, however, from the very onset of the disease, in addition to headache, backache and quite an extensive degree of nervousness, much pain in the right lower quadrant of the abdomen, associated with early and continued abdominal tympany; liver dulness was absent, splenic dulness increased.

When seen in consultation on the fifteenth day of the disease, she complained bitterly of severe and constant abdominal pain especially in the right iliac region, constant nausea and some vomiting; pulse 140, temperature 100°. The pulse rate from the beginning of her illness had been unusually high, the chart showing it at no time less than 120. Temperature, which at this time was 100°, had ranged during the previous 2 weeks between 102.2° in the morning to 105°, the highest, in the afternoon. The pinched expression was pronounced and the patient in every way showed evidence of great illness. The point of greatest tenderness was just above and to the right of the pubes. Blood count at this time showed leukocytes to be 11,000. The patient was again seen 4 hours later, and a second blood count made, showing a leukocytosis of 14,000. Operation was at once advised.

Under ether anesthesia an incision 5 inches in length was made along the outer border of the right rectus muscle. The abdomen was found filled with gas and a large quantity of chocolate-colored fluid mixed with feces, that the exudate had made no attempt at walling off. The opening in the bowel was readily found because of its great extent, in the ileum about 10 to 12 centimeters from the valve. The rent in the bowel involved nearly the entire lumen transverse to its long axis. The ileum and several inches of the ascending colon were firmly anchored by well-organized adhesions, evidently of long standing. The appendix could not be brought into the incision because of this firm anchorage of itself and the colon to the outer parietal wall.

The rent in the bowel was closed by means of the Czerny-Lembert sutures, the abdomen flushed with normal salt solution and afterward dried by means of sterile gauze mopping. Plain sterile gauze was packed about the sutured bowel and brought out through the incision, the remainder of it being closed.

Notwithstanding the extreme condition of the patient before, and at the time of operation, she seemed to stand it well, and if anything, somewhat rallied from it; there was certainly at least no pronounced shock following the operation; there was not any pronounced improvement, however, and the patient died 60 hours later.

AUTOPSY: Anatomical Diagnosis: Perforation of the ileum about 12 centimeters above the ileocecal valve involving the entire bowel. The deep sutures had firmly held while the Lembert sutures showed that they had been dragged upon by some tension which had been exerted upon them. Agglutination of the coils of the ileum existed throughout most of the lower right side. The appendix was cicatricial to near its distal extremity, where it was firmly adherent to the lateral wall of the parietal peritoneum. It derived its nutrition entirely from this source. The colon was also firmly bound down. The position occupied by the appendix showed clearly the tension that it had exerted on the closed wound in the ileum. There had been, however, no escape of the contents of the bowel into the general peritoneal cavity after operation. The adhesions found between the coils of the intestines and also those about the appendix and colon were so firmly organized that they could not have occurred from the appendicitis in this attack.

In going over the earlier history of the patient, I find that she had suffered for some time from dull aching in the right side, though never any decided pain, often extending down the right leg, with spells of nausea, occasional vomiting and obstinate constipation; in other words, a very clear history of an insidious appendicitis.

CASE 2. (October, 1903.) A female, aged 22 years, married. Was seen in consultation on the fifth day of her illness, which was thought by her attending physician to be typhoid fever, though somewhat in doubt because of the history of an attack of appendicitis, mild in type, some months previous. In the beginning the patient had a chill with headache, backache and some epistaxis. The abdomen was somewhat tympanitic, liver dulness absent and splenic alteration could not be detected. There was considerable pain, which was constant, and there was marked tenderness on the slightest pressure in the right iliac region, extending up as high as the costal cartilages. There were constant nausea, anorexia and constipation; pulse 120, temperature when I saw her at noon 101.8° Previous to this, temperature record showed a variance from 101° in the morning to 102.4° in the afternoon. On palpation, rigidity was marked and an inflammatory mass could be distinctly felt in the region of the appendix. The tongue was coated with a dirty brown coating and flabby tooth-marked edges.

With the history of a previous attack, therefore, almost certainly extensive adhesions, and with the undoubted presence of an acute attack now existing, I felt it was good counsel to advise immediate operation for the removal of the appendix, even in the face of a probably developing typhoid fever, recalling as I did, the clinical picture of the preceding case, which I had seen but a few months before.

OPERATION on the seventh day of illness, ether anesthesia. Incision was made 3½ inches in length directly over McBurney's point. After a search of several minutes, an unusually short appendix with a cicatricial centre was found embedded in an inflammatory mass behind the cecum. There was no pus present, though the intestines about the ileocecal region were intensely injected, and in several places there was agglutination of the coils of the ileum in the lower 2 feet. The mesenteric glands seemed everywhere greatly enlarged and to the sense of touch so like the appendix that several times during the search they were brought out through the incision in mistake for the appendix. After taking much pains to break up all adhesions, the incision was closed without drainage and the patient made an uneventful recovery. Stitches were removed on the tenth day.

The operation in no way interfered with the natural course of the fever from which she was suffering. Microscopic examination of a transverse section of the appendix showed that complete cicatricial obliteration of the lumen had not yet occurred.

Blood count on the morning of the operation showed the number of white corpuscles 11,000. Positive diagnosis by the Widal reaction was made on the eighth day, or the day following operation. Temperature throughout the illness showed the highest reached in the afternoon, 103.8°, morning temperature 102°. The pulse ranged between 100 and 116. The entire course of the disease was characterized by constipation, it being necessary to use enemas whenever bowel movements were secured.

While the pathologic condition found in these two cases does not give the whole truth, it certainly goes far toward presenting a clue along the lines of prophylaxis in perforative peritonitis.

I am thoroughly convinced that in Case 1 the function of the bowel was so impaired by adhesions, not only of the coils of the ileum to each other, but the tension caused by adhesion of the appendix to the lateral parietal peritoneum, which favored solution in the continuity of the bowel at the point of ulceration at the site of Peyer's patches, was entirely responsible for the tremendous rent that took place. This was demonstrable at the post mortem, which showed the great amount of tension on the superficial sutures.

In Case 2, the only interpretation that could be placed upon the extensive adhesions so like those found in Case 1, is that a like result should have been expected. The inflammatory exudate which takes place after every attack of appendicitis, it matters not how mild the type, is certain to impair to a degree the function of the bowel, not only immediately about the ileocecal region, but often extending over a considerable extent of the ileum, disarranging the circulation and in this way bringing about structural change in the bowel, interfering as well with the fecal current, and together serving as a most potent factor in the production of perforation.

When the appendix has once been the seat of inflammatory change, a disease like typhoid fever is sure to light up a recurrence, and as at best its powers of resistance are poor, it could hardly be expected to escape rupture within the organ itself, or what would seem more often to take place, rupture of a Peyer's patch, which if not actually caused by impairment of the function due to preexisting disease in the appendix, may be regarded as at least favoring it. Not only do the two cases here reported bear out this belief, but many of those recorded do also, notably two of Osler's cases; one on admission had an inflammatory mass the size of a walnut in the region of the appendix, while the other at the autopsy showed perforation of the ileocecal region and the appendix embedded in an inflammatory mass. One of Hare's two cases also showed preexisting disease in the appendix. Indeed proof of preexisting disease in the appendix in cases of perforation in typhoid fever is not wanting if careful analysis be made of the literature on the subject. Toft says that from personal investigation of 300 cases of illness of all sorts, every third person between the ages of twenty and seventy showed evidence of present or past traces of inflammation of the appendix, and that actual structural change existed in 5 per cent. of all bodies examined. Kraussald declares that this percentage is rather too low than too high.

If these percentages can be considered as accurate, it is within the power of the surgeon to reduce the mortality in perforative peritonitis in typhoid fever from 80 per cent. to 73 per cent.; first, by eliminating the appendix as a factor; second, by freeing the agglutinated intestines from adhesions caused by previous attacks of appendicitis, which afford possibility of still further serving as prophylaxis against occurrence of perforation in the ileum. The majority of observers agree that acute appendicitis occurring during the course of typhoid fever is merely a coincidence, and is probably in no instance the result of the bacillus of Eberth, nor due to the general infective process resulting from the fever.

Hopfenhausen (4) shows in a study of thirty appendices removed from typhoid subjects dying from either asthenia or toxemia, that no special change existed in the appendix further than slight cellular infiltration, in no way sufficient to interfere with the function of the organ, and only that change that would be found anywhere in the intestinal tract that is supplied with lymphoid tissue; the type of appendicitis, therefore, that may be looked for during the course of typhoid fever, will usually be the recurrent.

Clinicians are generally agreed that the opinion, formerly held, of doubting the existence of typhoid fever when bowel symptoms are absent, is entirely erroneous and, as a matter of fact, bowel lesions are, if the bowel be previously healthy, rather atypical than typical symptoms at the onset of the disease.

With this knowledge in mind, when a case of typhoid fever presents, among its earliest symptoms, pain in the right lower quadrant of the abdomen with tenderness, nausea or vomiting, aching or discomfort in the groin, ofttimes extending down the leg, anorexia, and last but not least, rigidity of the right rectus muscle, a relighting up of a preexisting disease should be suspected. Knowing, as we now do, that the right iliac fossa is not tender early in typhoid fever, at least not until after the seventh or eighth day, when the bacillus of Eberth is deposited in the glands of the intestines (Peyer's patches), immediate laparotomy would seem the only wise course to pursue under such circumstances. At operation not only should the appendix be removed, but also the agglutinated coils of the ileum should be thoroughly freed from their tied-down position, which must of necessity impair nutrition of the parts, and consequently diminish its structural resistance.

Dieulafoy states that if an appendicitis exist, the course of the fever will be higher early in the disease, and it may also be inferred that the morning drop in temperature will be less pronounced.

A study of the temperature and pulse in the cases recorded by Finney, Osler, Fitz, Cushing and others confirms this observation, especially in reference to the pulse, which is found to be continuously higher than is found in uncomplicated cases of typhoid fever.

REFERENCES:

1. Transactions of the Association for Internal Medicine, Berlin, 1884, No. 17, page 258. 2. Sammlung klinische Vortrage, Richard von Volkmann, No. 262. 3. Philada. Medical Times, Dec. 11, 1886. 4. Revue med. de la Suisse Romande, Feb. 20, 1899.

DISCUSSION.

DR. W. W. KEEN: Taylor, not long since, went over the question of the number of typhoid fever patients and the number of deaths in this country occurring annually, based upon the census records and the records of the Marine Hospital service. His estimate is that there occur in this country about 500,000 cases of typhoid fever a year; and, taking a fair mortality rate of 10%, that the number of deaths is about 50,000. In a paper recently published by Osler he states that, of all the deaths from typhoid fever at Johns Hopkins Hospital, about 30% are due to perforation. We may assume, therefore, that there are not far from 15,000 patients who die from perforation in the United States every year

We know that the recovery rate in cases of perforation in typhoid has increased from less than 18% up to 1898 to about 30% or even 35% or 40%; and, in some cases of individual hospitals in which there are exceptional advantages, to nearly 50%. If we take only 30%, we find that of the 15,000 cases that die every year in America from typhoid perforation there should be 4,500 recoveries. In spite of the fact that a large number of important publications within the last few years have called attention to the utmost urgency of immediate operation in every case of perforation, if you will look at the very important paper by Harte and Ashhurst in the *American Journal of the Medical Sciences* you will find that within the last 6 years in the entire civilized world there have been only 210 cases of operation reported and 61 cases of recovery—that is, 10 recoveries a year. Instead of this there ought to have been in America alone 15,000 cases of operation annually and 4,500 recoveries. I think that Dr. Hammond has done good service in calling attention to an uncommon phase of perforation in the appendix, while perforations in other parts of the intestine are much more frequent. He is right in urging operation, not only in these, but furthermore, I would urge in *every* case of perforation unless the patient were *in articulo mortis*, that we should operate.

DR. JOHN B. DEAVER: I personally do not believe there is such a thing as a healthy vermiform appendix, if subjected to microscopic examination. I must take exception to the removal of the appendix in typhoid fever, unless the case is believed to be one of perforative appendicitis. In many cases I am unable to draw a distinction. I believe that in typhoid fever the less you do surgically the better. I believe that much harm can accrue from traumatism consequent upon the removal of the appendix during an attack of typhoid fever, particularly if we have adhesions to deal with. Because, in this way the resistance of the small bowel can be materially lowered so that it is placed in a condition more favorable for perforation. This would be my ground for taking exception to Dr. Hammond's operation, which in itself was considerable. In short, the condition of the small intestine after such operative procedure is, in my mind, worse than before it. At the German Hospital lately I was urged to operate in 2 cases of appendicitis complicating typhoid fever; but I refused. The next day there were bowel hemorrhages. There was improvement, then a relapse, and still I refused to operate. Within 6 months after recovery from typhoid fever I operated on the appendix with complete success. I do not believe that every case of typhoid perforation dies, because I have seen patients recover with the following symptoms: a temperature of 105°, dropping to subnormal, severe pain, distension, vomiting, rapid pulse, etc., diagnosed as typhoid perforation. Recently I was asked to see a patient with supposed typhoid perforation; I could not agree that there was perforation. There was hemorrhage of the bowel, and although I could not say specifically that there was not also a perforation the father preferred that operation be done. I operated and found the small bowel full of blood, but no perforation. Therefore, I repeat, I think it requires good judgment supported by a large experience to hold off the knife in many cases of typhoid fever when you believe you are dealing with appendiceal inflammation. That you should take out the appendix in all such cases in typhoid fever I do not believe for one instant.

DR. MORDECAI PRICE: I believe that appendicitis is very prevalent. I also believe that typhoid fever and appendicitis are confounded and should not be. I think any one who has seen many cases of appendicitis can select them from those of typhoid. Acute appendicitis does not give you a week of slowly ascending pulse and temperature. When you have a subnormal temperature and a quick pulse there is pus in the peritoneum. You can see the most severe lesions of the appendix with very few symptoms. (He referred to such a case.) When there is doubt as to the diagnosis of disease in the right lower quadrant of the abdomen I believe we ought to do an exploratory operation. I believe that all the cases of socalled fulminating appendicitis are the cases that are walking around for 2 or 3 months after they have the disease. When perforation o curs in the cours: of typhoid fever it ought to be attended to radically and at once. Opening the abdomen does not hurt a typhoid patient; it gives him a certain amount of counterirritation. The death rate is not due to the appendicitis; it is due to the surgeon. One-half the surgeons take out the appendix, but leave a sloughing piece of appendix. The thing to do is either to use a circular ligature of the peritoneum and amputation, or take the appendix out, strip off the peritoneum and tie the vessels. Take two No. 6 cambric needles, pass them into the peritoneum on one side and out on the other side; cut the appendix off bang up against the needles; tie the ligatures; put in 3 Lembert sutures, and wash out the abdomen with boiled water. Why any one should use salt solution I cannot understand; because, in my experience, both it and bichlorid cause the bowels to become matted together with plastic lymph.

DR. L. J. HAMMOND: It seems to me that Dr. Keen has given most important advice when he says "Operate before perforation occurs if surgical indications exist, rather than wait for perforation to take place." I have, apparently, not been able to make myself clear to Dr. Deaver, as he fails to see what relation the subject under discussion has to perforation in typhoid fever. The relation that I have endeavored to show as existing is, that in cases of typhoid fever, with a history of a preexisting appendiceal attack, there is every reason to believe, and in the cases reported there certainly was, an inflammatory agglutination not only of the appendix, but also of the coils of intestine in the right iliac region, sufficiently great to so alter the relations of the parts as to lessen their functional resistance, and to favor the perforation of a typhoid ulcer: it is therefore, I repeat, a means by which a certain percentage of typhoid perforations may be anticipated. I further distinctly said that authorities agree that all cases of typhoid perforation do not die, it being estimated that about 5% recover without operation.

The Antiseptic Treatment of Smallpox.

BY SAMUEL M. WILSON, M.D.

[Read April 13.]

During the last few years an unusual interest in smallpox has been shown, particularly in regard to its diagnosis. Interest is always felt in the question of treatment. This has two objects: assisting the patient to recover his health and, if possible, to protect him from disfiguring scars. Most clinicians treat the disease on general principles, light diet and cool baths, or sponging, during the primary fever; symptoms that assume prominence being met by any means that appear suitable.

When the suppurative stage is reached, we have to deal with a general septic condition, calling as usual for supporting treatment and the free use of stimulants, particularly alcohol. Internal antiseptics appear useless.

Various plans to avoid scars have been tried. Many still follow the old method of excluding light from the sick-room, and applying some emollient, such as vaseline or glycerin, incorporating usually an antiseptic, but mainly with the object of preventing early rupture of the pustule. Others prefer to puncture the vesicle and apply a wet dressing of an antiseptic solution or plain water. The use of red window-glass or red curtains seems useful, but is said to prolong convalescence, and it is doubtful if the withdrawal of the ultraviolet rays of light is not injurious to the patient, as well as to the microorganisms at fault.

The frightful scarring shown by some of those who have recently recovered from the disease proves that the plans in common use frequently fail. I would like, therefore, to draw attention to a method that has been recommended by several writers: the daily use of scrub baths. Some of the more recent text-books refer to it. Perhaps the main reason that it is not generally adopted, is that it is rather painful to the patient, after vesiculation has commenced. Thoroughly used before the primary papules develop, it appears to prevent vesiculation. Instituted too late for that, it does away, to a great extent, with the repulsive appearance and foul odor characteristic of cases treated without this means.

If the patient be not seen until vesiculation has begun, the summits of the vesicles must be punctured, compresses of full strength hydrogen peroxid solution applied, and these followed by a mask wet with some antiseptic. A solution of mercury bichlorid—one part in fifteen hundred parts of water—gives good results. This need remain in place for a few minutes only. The hydrogen peroxid followed by the mask may be used several times daily if desired, and appears to add to the comfort of the patient, as well as to promote desquamation.

In two unvaccinated young girls in whom vesiculation was commencing when the patients were first seen, the scrubbing, combined with puncture of the vesicles, was very successful. Where the treatment was thoroughly applied, on the hands and face, the vesicles, although large and numerous, left only a few faint traces, almost imperceptible on close examination. The legs and feet received less care, and several well-marked pits resulted. Neither child was seriously sick after the seventh day of the disease.

If the characteristic umbilicated pustule fails to develop, it is practically impossible to declare a case, that recovers, to be one of smallpox. In several cases in which a probable diagnosis of beginning varioloid was made, the scrubbing treatment, with toilet sandsoap, was applied promptly. Four of these were in one family. In each a vesicular rash appeared, drying in a few days, but left a few perceptible scars. In two other cases, a daughter, and subsequently her mother, developed a macular rash followed by desquamation and showed no further evidence of being ill, the disease lasting four days in the mother and five in the child.

Recent Advances in Our Knowledge of Immunity.

By JOSEPH MCFARLAND, M. D.

[Read April 27.]

The recent advances in our knowledge of immunity, about which I am to address you for twenty minutes this evening, comprehend a series of investigations, the greater number of which have been stimulated by the pregnant suggestions of Metchnikoff and Ehrlich, and have opened up a most fascinating and fruitful field of active research in physiologic chemistry. It might almost be said that the majority of workers in pathology, bacteriology and physiologic chemistry have neglected other subjects during the past five years to devote themselves to studies of the phenomena of immunity.

The nature of the body defenses has been shown, as the result of these investigations, to be discouragingly complicated, and the voluminousness of the literature of the subject, as well as the new terminology that it contains, make it particularly apropos that frequent résumés be written for the benefit of those whose time being engrossed by other and more practical reading are unable to pursue the subject completely.

The phenomena of immunity, as we now describe those body reactions which seem to have a direct protective tendency, include the following: (1) Natural immunity against poisons; (2) natural immunity against organized bodies; (3) acquired immunity against poisons; (4) acquired immunity against organized bodies; (5) the production of antitoxin and other antibodies; (6) the production of hemolysins and other cytotoxins; (7) the production of bacteriolysins; (8) the phenomena of agglutination; (9) the phenomena of specific precipitation.

It would be impossible in the brief time allotted to endeavor to give an account of each of these particular phenomena, but a description of the most interesting and suggestive theory of immunity will bring out a sufficient consideration of the greater number to enable one to understand their principal features and mode of occurrence.

Of course it is well known that two great theories are offered for the explanation of immunity, the older, that of Metchnikoff, being known as "The Theory of Phagocytosis," the more recent, that of Ehrlich, as "The Lateral Chain Theory."

Metchnikoff's theory was based on the microscopic observations of infected water fleas or daphnia. When these minute organisms were infected by fungus they sometimes died and sometimes recovered. In the cases that recovered it was observed that certain of the body cells clustered about the invading parasites and seemed to destroy them, whereas in the cases that died the cells seemed unable so to do. Metchnikoff inferred that the successful antagonism of the parasites by the cells was the explanation of the recovery of the infected daphnia, and finding that by some peculiar phenomena the body cells of higher animals attacked and devoured parasitic organisms, he drew the justifiable inference that the success of the body in resisting invasion depended upon the successful warfare of its phagocytic army against the invading parasites. The theory is, therefore, one in which cells, active living cells, are engaged in attacking, devouring, killing, digesting and disposing of the body's enemies.

At the time this theory was promulgated, it was not thought that the phenomena of immunity also embraced defenses against intoxication and means of destroying and annulling the effects of poisons; and when it was shown that such must be included, the theory of Metchnikoff was found wanting. Though the theory was, so to speak, based upon morphological appearances, its ultimate explanation had to be looked for in chemical conditions arising within cells; for it is evident that microorganisms taken up by the cells can only be destroyed through some chemical substance—some digestive enzyme—which they contain, so that after all the theory was a chemical one, the chemical substance simply being regarded as a component part of the phagocytic cells.

The lateral chain theory of Ehrlich, which made its appearance in 1897, is a purely chemical theory, in which the cells of the body are not supposed to play any active part, but in which all of the phenomena of immunity are thought to depend upon substances in solution in the blood plasma. It is true that Metchnikoff has endeavored to show that these active substances, whose presence is easily demonstrable, may be the products of cellular activity. Indeed, he is inclined to view them as nothing but cellular enzymes which, through the accidental destruction of the cells by which they were produced, have been set free in the blood serum; but this explanation, satisfactory as it would undoubtedly be, cannot be proved, and the recent experiments of Macfadyen and Rowland would seem to indicate that the leukocytes which constitute Metchnikoff's great phagocytic army, do not contain the active substances he supposes. We are, therefore, inclined to believe that the theory of Metchnikoff, fascinating as it is, is in error, and that the weight of evidence is in favor of some such view as is expressed in the lateral chain theory. This theory, suggested by Ehrlich in 1897, was the outcome of a series of studies into the constitution of diphtheria toxin and, to be strictly accurate, one should follow the development of the hypothesis from this point of view; but it has always seemed to me to be more comprehensible when viewed from the standpoint of cellular nutrition, and it is thus that I wish to endeavor briefly to explain it this evening.

The lateral chain theory is based upon specific affinities existing between the cells and certain substances chemically adapted to their metabolic requirements. It is well known to every physiologist that certain cells have a peculiar selective tendency which leads them to absorb substances never touched by others. Examples of this are most easily detected in such toxic conditions as follow the administration of strychnin, or occur in tetanus and diphtheria. Thus, in strychnin and tetanus intoxication the brunt of the intoxication seems to fall upon the motor cells of the nervous system, and in diphtheria intoxication upon the peripheral nerves, possibly because these particular elements are more susceptible to the action of the poison, but probably because they alone are adapted to absorb it.

Ehrlich accounts for this specific affinity by presuming that the cell protoplasm is chemically so constituted as to provide a number of side chains or combining atomic groups by which the various nutrient combinations necessitated by the cellular metabolism may be provided for. These side chains or lateral chains of combining atoms he describes as "receptors." The corresponding molecular combinations adapted for combination with them, he describes as "haptophores." Each cell is supposed to possess many and varied receptors which by appropriate combinations with their adapted haptophores maintain the cellular nutrition and provide the cells with such substances as they need in performing their respective functions.

Under normal conditions it may be presumed that all the haptophorous molecules present in the blood are normally adapted for combination with the receptors of certain cells. Many of these haptophores which furnish ordinarily nutritive elements must be adapted for combination with many, perhaps the great majority, of cells. Other haptophores convey to certain cells substances required in their peculiar metabolism. A few haptophores may be adapted to receptors possessed by cells of one kind only.

It is not conceivable that the parietal cells of the gastric glands by which the hydrochloric acid of the gastric juice is secreted shall possess identical receptors adapted to the same haptophores as the motor cells of the spinal cord, whose function it is to discharge nervous impulses.

In inorganic chemistry, isomerism is a well-known fact. In physiologic chemistry it seems probable that different substances of very similar chemical combinations may possess very similar, though not identical, haptophores, and that under morbid conditions there may appear in the body as the result of its own energies or as the result of the metabolism of parasites, abnormal or even foreign haptophores more or less isomerically identical with the normal haptophores and capable of the same combinations, but which combinations instead of always resulting in the normal nutrition of the cells may bring to them nonutilizable or harmful substances by which their normal activities may be inhibited or abnormal energies initiated, so that disease becomes inevitable. From this point of view, the convulsions occasioned by tetanus toxin and strychnin depend upon the union of the receptors of the motor cells with abnormal though perfectly adapted haptophores possessing more or less isomerism with certain of the albuminous constituents of the blood through which these cells are normally nourished, but which act injuriously upon them by inhibiting their normal nutrition and partially asphyxiating them or directly poisoning them.

So much for the matter of specific affinities, the study of which shows us that the poisonous character of any substance must depend upon the adaptation of its haptophorous molecules to the receptors of the cells, and that in all cases in which the cells are without receptors possessing such adaptation, natural immunity must exist.

Ehrlich's study of the constitution of the diphtheria toxin led to the discovery that the active substances are not simple but complex, and that there are present both haptophorous and toxophorous groups, and that the haptophorous molecules may attach themselves to the cells independently of toxophorous action, though the toxophores are unable to effect such combinations in the absence of the haptophores. Natural immunity may, therefore, depend upon the failure of enough toxophorous substance to be brought into contact with the cellular substance by the haptophorous combinations, as well as upon the complete absence of haptophorous unions. This probably explains the interesting cases in which immunity is relative; that is, a certain quantity of poisonous material fails to affect an animal at all, though a very large quantity produces a reaction, and may be fatal.

The cell receptors are essential to the maintenance of cellular nutrition, and should any of them form combinations with haptophores, morphologically or chemically adapted for combination with them, but unable to nourish them, the disadvantages under which the cell would find itself would probably result in the formation of new receptors, or, as Ehrlich expresses it, in the regeneration of receptors by which the nutrition of the cell could be maintained. The activity of regeneration would be in proportion to the number of useless combinations effected. This regeneration of receptors is believed by Ehrlich to explain all of the phenomena of acquired immunity.

It is known that if an animal be injected with a quantity of poison insufficient to bring about its death, it acquires the ability to endure without injury a larger quantity of that poison, and the more frequently it is thus obliged to endure it, the greater its power of endurance becomes, when in the case of certain poisons—diphtheria toxin, tetanus toxin, etc.—the animal may be inured to the effect of hundreds of times the original lethal dose. Such immunization can only be effected in animals possessing receptors and, therefore, a partial susceptibility to the intoxication. The endurance acquired is supposed to depend upon the increasing number of receptors by which the increasing number of haptophores can combine with the cell without completely inhibiting its functions. When no haptophorous molecules of an undesirable nature are present in the blood, the presence of these excessive receptors is disadvantageous, and the cell seems to eliminate them into the surrounding tissue juices, from which they enter the blood, where they seem to circulate for a considerable length of time before meeting final destruction or elimination from the body. Such detached receptors possess identical combining affinities with those still intact upon the cell, so that the appearance of appropriately adapted haptophorous molecules in the blood causes immediate combinations with them.

The antibodies, of which the antitoxin may be taken as a typical example, seem to owe their potency to the number of receptors contained in the blood serum, these receptors retaining their combining function in the blood of the animal in which they are produced, in the blood of any other animal into which they happen to be introduced, or *in vitro*.

In considering the phenomena of immunity against organized bodies of all kinds, phenomena which may be appropriately considered under the general heading, "cytolysis," we meet with a more difficult and more complicated reaction than has been described. The phenomena, instead of resembling ordinary chemical nutritions, more nearly approach those of digestion in which certain substances are active upon others for which they have specific affinities only in the presence of other intermediate substances. Thus, for example, pepsin transforms proteids only in the presence of hydrochloric acid, trypsin is activated by enterokinase, fibrinogen is transformed to fibrin only in the presence of calcium salts, and rennet acts upon caseinogen only under the same condition.

Intelligent understanding of these phenomena, which had long been observed by Buchner, Nuttall and others, and which constituted the essence of Pfeiffer's phenomenon, etc., began with investigations into the disappearance of heterogeneous blood corpuscles by Ehrlich and Morgenroth, who found that when the blood of any animal is repeatedly injected into the body of another, the blood of the second animal becomes hemolytic for the corpuscles of that particular kind of animal or particular animal with which it is injected, and that this reaction is accomplished through the presence of certain substances invariably present in the blood, and certain other substances appearing as the result of manipulation, and varying according to the degree of activity possessed by the blood of the manipulated animal.

Many subsequent investigations have shown that these two factors are invariable in all cases of cytolysis, that in all the actually digesting or dissolving substances, by which the organized body, whether yeasts, bacteria, parasites or tissue elements, are dissolved, are preexistent in the blood and comparatively invariable in activity. These substances are variously described as alexins, cytases, complementary substances and lysins. Whether they are specific in action, as thought by Ehrlich, is doubted by Bordet, and divergent views upon this matter are held by different investigators. The other substance, by which the actual solvent is activated and which varies in amount according to the activity of the serum of the manipulated animal, is called the immune body, the intermediate body, the amboceptor, the desmon, *fixateur* and the *substance sensibilisatrice*, by different writers. It is specific in each case. Thus, when an animal is repeatedly injected with red corpuscles, its serum develops a body that determines that solvent substances present in it, or in the bloods of other animals not manipulated, shall be exerted upon blood corpuscles; not upon blood corpuscles generally, but upon blood corpuscles of that particular kind with which the animal was injected. Or if the manipulated animal be injected with cultures of bacteria, the immune body or amboceptor developing in its blood will so activate the solvent substances of other bloods that they will destroy bacteria, not of any kind, but of the particular kind with which the manipulated animal was injected, and so the stimulation of any particular organized body introduced into an animal will cause the generation in its body of an amboceptor which activates the lysins to effect its solution only. The action then of the immune body or amboceptor is always specific. Without its presence the lysins or complementary bodies are inactive.

The fortunate result of the investigation of the phenomena of immunity has been the successful utilization of immune serums in therapeusis, and in those cases in which the substances interact directly (antitoxins), there is no comparison with the therapeutic successes achieved. The whole world now concedes the value of antitoxin in the treatment of diphtheria. The varying successes and failures of antivenene in the treatment of snakebite depend upon conditions readily understood. Antitetanic serum will prevent tetanus, though the tetanus toxin becomes so firmly anchored to the nerve cells through its haptophorous adaptations that the serum is of doubtful value for treatment.

But in the application of immune substances of indirect action (amboceptors and complements), we are confronted with the misfortune that though we can produce at will the amboceptor or sensitizing substance by which the destruction of organized bodies is brought about, the actual destruction of these bodies depends upon the lysin, which is invariable, and we are at the present time unfortunately unable to devise any practical means of increasing the most necessary and desirable lysin or complement upon which the activity of the serum must depend.

The specific agglutination and the specific precipitations doubtless depend upon conditions preliminary to or associated with the reactions already described; but their true significance is not understood and their practical bearing, from a therapeutic point of view, seems to be slight, so that we can at the present moment merely mention them as interesting phenomena.

DISCUSSION.

DR. MCFARLAND, in answer to a question by DR. CHANDLER, said: The isolation of these bodies has not been achieved; but that is not surprising, because we have no idea what their chemical nature may be. They may not be actually existing entities, but properties of globulins, albumins or other substances in the blood. The demonstration of their existence by such means as I have shown you leaves no room to doubt that, whatever they may be, they are there. The combination between the haptophores and receptors is apparently quite a permanent one, putting the receptor to which it is attached out of service for a considerable time. What becomes of it nobody knows. Having brought the two in contact they seem to remain so, but by the injection of different immune bodies the one already attached can sometimes be torn loose so that the new one can take its place, just as one salt will withdraw another for which it has a greater affinity from a combination.

A Consideration of Some of the Methods to be Pursued in the Diagnosis of the Diseases of the Rectum and Anus.

BY LEWIS H. ADLER, JR., M. D.

[Read April 27.]

At the request of the directors of the Society I have prepared this paper, and I trust that its character will prove such that the general practitioner may gather from it some points of practical importance in dealing with the affections under consideration.

The utmost tact and gentleness are required on the part of the medical practitioner in dealing with persons afflicted with anal or rectal diseases. All patients suffering from maladies of this nature are especially prone to be depressed and are more or less nervous. This fact, combined with the natural restraint experienced in paying a first visit to a physician, should be realized by the examiner, and in order to aid such persons to recover their composure it is best to encourage them to give the history of their troubles in detail. While this consumes time, the more important object is accomplished of securing the cooperation of the patient in the subsequent steps of the investigation—to wit, the digital as well as, in some cases, the instrumental exploration of the bowel, without which a positive opinion cannot be formed as to the nature of any rectal ailment. These remarks are especially applicable to the treatment of females. Assent to a vaginal examination is much more readily obtained than is the consent to inspect the seat of rectal trouble.

Having obtained the subjective symptoms and being satisfied as to the existence of a rectal lesion, we proceed to confirm the provisional diagnosis and to obtain positive information upon which to base the prognosis and to guide the treatment, by making a thorough local examination of the anus and adjacent parts, including the rectum. If possible, the patient should have the bowel emptied by an enema a short time prior to attempting the examination. In the case of female patients especially, the neglect of this will frequently render a thorough investigation impossible, without recourse to general anesthesia—nitrous oxide gas or ether—owing to the patient's fear of an accident occurring, such as the escape of flatus. When this has not been done I have known the sphincter muscles to be so tightly closed that the surgeon's attempts to explore the parts were absolutely frustrated. When a specular examination is necessary—as in the investigation of the higher portions of the rectum or of the sigmoid flexure, it is absolutely essential that the lower bowel be free from fecal matter.

There are several positions in which the patient may be placed for the examination, but for general use I think that the most comfortable as well as the most delicate posture for the patient, and that most convenient for the examiner, is for the patient to be placed on a firm couch which has an elevation of three and one-half to four feet, to lie on the left side, the right shoulder turned away from the practitioner, the left arm brought behind the body, the right thigh only being well flexed upon the abdomen, and the left lower limb being kept perfectly straight. The buttocks should extend somewhat over the edge of the table, and the uppermost cheek may be raised by the patient's right hand. In examining with the fingers for the presence of strictures or growths situated above the lower four inches of the bowel, the patient by being directed to stand on his feet, but in a posture assumed as in sitting, may by straining press the diseased part nearer the anus, so that at least an inch more of the bowel may be explored than can be done when the patient assumes the usual position, even though directions have been given to bear down.

Regarding light, either natural or artificial light may be employed. For an ordinary examination I prefer daylight. By means of a head-mirror the operator. sitting facing the light and the patient's back being from the same, the light may be concentrated upon any particular point requiring observation.

Everything being in readiness for the examination, we now proceed to inspect the condition of the external parts. On separating the buttocks, the orifice of the anus will come into view. Its shape should be carefully observed as to whether it is abnormally narrowed or dilated, and whether the pigment of the surrounding skin is natural, increased or lessened. Eruptions of any kind—eczematous, syphilitic, parasitic or otherwise—should be noticed.

In this connection, for the sake of emphasizing the importance of careful observation of conditions of this kind, I shall relate an incident of a patient who came to me complaining of a marked pruritus ani. After what I thought had been a thorough inspection of the parts and I was about to apply the usual treatment for this malady when no discoverable local cause for its existence is manifest, I noticed a black speck at the root of one of the hairs. Upon further examination others were observed which proved to be full-fledged pediculi. External hemorrhoids, epitheliomata or condylomata will also be noted, if present. Palpation will enable us to detect any induration that exists, which may be due to a fistulous tract or to an abscess. If the parts are covered with a discharge, it should be wiped away and its source traced, as to whether it is from an external opening of a fistulous tract, etc.

If the anal aperture is not abnormally contracted and the patient be requested to strain while the examiner puts on the stretch with the thumbs the opposite sides of the anal outlet, and repeats this process around the circumference of the anus, a pretty good. view of the anal canal may be obtained. In this manner, internal hemorrhoids, ulcers and the internal openings of many fistulæ may be seen.

The next step is to make a digital examination of the interior of the rectum. It is by this means that the most important information is to be gleaned, and it is a procedure that should never be omitted in any cases of presumed rectal trouble. Such an investigation is not a very pleasant one, either to the patient or to the practitioner, yet without making it the physician needlessly sacrifices his reputation and risks possibly the patient's chance for the prolongation of life by early surgical interference, as in cases of carcinoma.

The method of making the examination is as follows: The nail of the index finger being well trimmed and the finger lubricated with carbolized oil (5 per cent.), which I prefer to vaseline or similar substance, it is introduced into the bowel by a slow boring motion, in a direction at first slightly forward and then backward into the ampulla of the rectum. This should be done gradually, so as to allow the sphincters time to relax; if attempted too hurriedly or in too forcible a manner, spasm of the muscles will be to a certainty induced. As the finger enters the anus, the condition of the sphincters is to be noted. The strength, measured by the power of resistance, will be found to vary greatly in different persons. In the aged or debilitated it is apt to be very weak, and just the reverse in the strong and healthy. In persons of especially nervous tendency, and in cases of irritable ulcer (fissure) of the anus, a contraction may be met with, which, owing to the pain occasioned by an attempted examination, will render it an impossibility without recourse to an anesthetic (local or otherwise). As the finger passes beyond the margin of the external sphincter it should be swept around the anal canal in order to determine, if possible, the existence of any ulceration or other abnormal condition. It is just between the internal and the external sphincter muscles that most of the internal openings of fistulæ are found, and it is at this point that the presence of small foreign bodies may be detected, which have lodged in the crypts or in the mucous membrane.

At this point a word about internal hemorrhoids may not prove amiss. Their presence may be perceived by a digital examination, but only, in my opinion and experience, when they are thickened by inflammatory changes. Otherwise, it is impossible to recognize them by the sense of touch, and this is so in the majority of cases. Masses of hemorrhoids are frequently found upon ocular inspection after dilation of the sphincters, the prior existence of which could not be ascertained by the tactile sense.

The finger should now be passed its full length into the bowel unless prevented by some abnormal obstruction, such as a stricture, etc. By instructing the patient to bear down forcibly an additional one-half inch of the rectum can be explored. Another one-half inch may be gained by the surgeon pressing upward upon the perineum with the thumb over this region and the other fingers of the examining hand kept extended and carried backward along the intergluteal groove. Usually an examination is made with the other fingers closed in the palm and the soft parts are pushed upon by the knuckles. This procedure prevents the full passage of the index finger.

In the manner indicated, about three and one-half or four inches of the rectum may be explored, together with the prostate, the neck of the bladder, the uterus, etc.

In making a rectal examination it must be borne in mind that very frequently two or more rectal diseases coexist, as for instance a polypoid growth complicating a fissure, or malignant disease existing with a fistula and hemorrhoids.

Malignant infiltration or a benign stricture can be readily detected if situated within reach. By sweeping the finger around the mucous membrane, its general condition can be noted; a general laxity or smoothness of the normal folds indicating atony; and a harshness and dryness, some alteration in the normal secretions due in all probability to atrophy of the glands. Ulcerations, when not merely superficial, may be recognized by the induration around their edges. Polypi can be readily felt, but in examining for them it is important that the finger be brought from above downward, as otherwise the growth may be pushed out of reach owing to the length of its pedicle, and its presence never recognized owing to its smoothness and usual slimy condition. Fecal masses in the rectal pouch can be recognized without difficulty.

In withdrawing the examining finger the coccyx should be grasped between the thumb and finger and moved backward and forward to determine its mobility and whether any tenderness exists.

Finally, upon the finger being withdrawn, several points may be gleaned by inspecting it. Should fecal matter have been encountered some of it will probably adhere to the digit. Its color, consistency and odor may be thus determined. The presence of blood, mucus or pus in the rectum may be likewise thus ascertained. In carcinoma of the rectum the odor imparted to the finger is to my mind pathognomonic of the disease. No other malady with which I am acquainted gives that sickening, feculent smell.

DISCUSSION.

DR. COLLIER FORD MARTIN: In making an examination of the rectum, the digital examination is probably the most important, as a large percentage of diseases of the rectum are well within the reach of the index finger. I believe that at times the use of a cleansing enema before a digital examination is a disadvantage; because the contents are swept out and we do not feel all the conditions present. If you do not first wash out the bowel, and there are any scybalous masses or a tendency to impaction you feel them pronouncedly. Even the presence of feces in the rectum shortly after the bowels have been moved is an indication of a spasmodic condition of the sphincter. Dr. Tuttle's term in describing this condition is "Unfinished business," a condition in which the bowels are never completely evacuated. When the bowels are moved normally there should be an absence of feces in the lower rectum for several hours after evacuation. Internal hemorrhoids cannot be felt with the finger, unless they are inflamed. It is customary to give an enema to make this diagnosis. The patient is directed to strain down or to sit over a vessel filled with hot water. It will be found that just as satisfactory a diagnosis can be made through the speculum. A small conical speculum should be inserted to its full extent, and after removing the obturator, the instrument should be withdrawn until the upper border of the internal sphincter is reached. By having the patient cough hard the internal hemorrhoids will then prolapse into the end of the speculum. Rectal examinations are distressing, particularly so to the female patient, and we should use all our efforts to make the examination as agreeable and painless as possible.

DR. ADLER: In regard to the diagnosis of hemorrhoids, I am pretty certain that, provided I find by an examination that no other disease exists, I am able to determine the presence of hemorrhoids by the patient's symptoms,—a history of protrusion and bleeding at stool. I would rather rely upon these symptoms than upon the use of the tubular speculum. My experience has been somewhat limited in the use of the instrument referred to by Dr. Martin,—the tubular speculum, having its distal end cut off at an acute angle,—but I would infer that in some instances it seems to indicate the presence of hemorrhoids when in reality there is simply a redundancy of some of the coats of the bowel which protrude into the mouth of the speculum. In other words, a lax mucous membrane may be seen by means of the Martin speculum, which is not hemorrhoidal and which does not justify the treatment for hemorrhoids.

Lilliputian Delivered of a Living Child by Caesarean Section.

BY L. H. BERND, M. D.

[Read April 27.]

The patient in question was Mrs. Caspar Weiss, an actress, wife of the lilliputian manager of the Lilliputian Company.

The husband was forty-nine inches high, well formed, and looked like a boy ten years old. The woman was the child of large people, born in Hamburg, Germany. At birth she weighed twelve pounds and was considered a fine baby. When thirteen years old she was thirty-six inches in height. Menstruation appeared at fourteen years with perfect normal history.

The patient, when first seen, was twenty years old, forty-six inches high, weighed sixty-two pounds, and was in the ninth month of gestation.

Her head was rachitic with a depressed nasal bridge. Hair was light straw-colored and rather fine. Her teeth were good, but a little crowded; no marks on them indicated hereditary syphilis. Her thyroid could be felt, but it was not specially prominent. Breasts normal, abdomen enlarged and protruding with a pouting of the umbilicus. She seemed very large for such a small person. The patient seemed like a little girl of nine or ten years old. Her mental faculties were rather infantile, wished to be amused.

The measurements of her pelvis were: crests of the ilium, 24 cm.; spines of the ilium, 21 cm.; bitrochanteric, 26 cm.; external conjugate, 17 cm.

Owing to her terror at the slightest examination it was impossible to measure her internal conjugate correctly. Suffice it to say, there seemed to be no disproportions. The head of the child seemed large, but the sutures easily compressed. She had had one premature birth of six and one-half months, the child living two hours.

On December 13, 1903, two weeks before term, I inserted a bougie which slipped out during the night while the patient slept. On the fourteenth three bougies were inserted and contractions were started. After the patient had been in labor for two hours the head did not engage. The membranes were then ruptured and, while the head seemed disproportionately large, I hoped to deliver her by forceps and for that reason had induced labor. I made two attempts to put the forceps on, but with the smallest forceps made there was not room enough in the vagina for both blades at the same time.

A Caesarean section was advised and consented to. The patient was placed on the table at 9.55 P. M. As the child occupied the left occipitoanterior position a Porro was decided upon. The patient was carried to her room at 10.35 P. M. The entire operation from scrubbing the abdomen to returning the patient to bed occupied forty minutes. Pulse, 120; temperature, 98.2°; respiration, 24.

The stump was sewed with formalin catgut. The abdomen was closed with a continuous catgut suture in the peritoneum; continuous catgut with two mattress sutures through the fascia, then three through-and-through silkworm gut down to, but not through, the peritoneum. A continuous catgut suture in the fat and one in the skin.

The three silkworm gut sutures were removed on the twenty-third, ten days after the operation. The patient sat up on January 7, 1904, twenty-six days after the operation, and left the hospital perfectly well.

The baby did not breathe very well at first, but eventually cried and seemed to be doing well. There was a marked caput succedaneum and the print of the forceps on the side of the occiput which faded within twelve hours. The baby was a female, weighed five and three-quarters pounds. Occipitomental measurement, 13 cm.; occipito-frontal, 11.5 cm.; biparietal, 9 cm.

The child was well nourished and appeared to be at full term, despite the history. It was put in an incubator, but did not do well, so was taken out and watched by a nurse who kept hot water bags around it to keep an even temperature. It died on the second day.

The case is unique, as it is the first lilliputian child of lilliputian parents to be born alive. Chiquita, who was three inches shorter than my patient, had a large husband and her baby was born dead.

Drs. John Cook Hirst, Heller, Helen Kirshbaum and Keyser assisted.

PROCEEDINGS

OF THE

Philadelphia County Medical Society.

SYMPOSIUM ON TUBERCULOSIS.

[May 11.]

History-taking in Cases of Pulmonary Tuberculosis.

By Charles J. Hatfield, A. M., M. D.

In the discussion this evening, we are to assume that the patient comes to the examining physician with some indication of tuberculous infection. This indication is to be verified and explained; a diagnosis is to be made, and the stage of the disease determined; so that a prognosis may be given and treatment instituted. A careful record of related facts is necessary in the study of any serious illness; and in no disease is this record of greater importance and interest than in tuberculosis.

The records of age, sex, color, social condition, nativity (ancestral and personal) and place of residence are naturally made first. Each of these data has an obvious diagnostic or prognostic value, either in itself or when considered in connection with some significant symptom. Thus a child or a person in middle life will have a more favorable prognosis than will a young adult or a patient debilitated by age; a woman will present various forms of tuberculous lesions, *e. g.*, those affecting the uterus and its appendages, which require special investigation; the negro in America is peculiarly susceptible to the disease, and exhibits a power of resistance considerably less than that of the white man; a married patient offers problems in the management of the case quite different from those of the unmarried; a native American is usually much better able to order his life for health and happiness than is a foreign-born immigrant; and the knowledge of the place of residence, whether healthy or the reverse, will aid materially in prescribing for a patient.

With the questions as to occupation, family history, habits of life and previous diseases, we enter upon a most interesting field of study, where we may hope to discover the actual exposure to contagion, or at least circumstances predisposing to the disease. It is certainly a gratification to be able to point to some definite association in the history and say with a certainty that satisfies at least yourself: "There the disease was contracted!" The effect of occupation is a most important study. The German authorities pronounce it, when a wage-earner is under consideration, of more value than the family history. In this investigation, it is by no means sufficient to know only the present calling, for a fairly large percentage of patients, having been previously warned that they are "threatened with lung trouble," have in consequence secured positions at out-door work, as drivers or motormen; whereas, formerly they may have been tailors or cigarmakers. A safe rule is one suggested by a colleague, who is in the habit of making a complete record of all the occupations successively engaged in, and the time spent in each, since the school days. In the list of significant occupations we can include all those which necessitate a sedentary life in crowded workrooms, with the possibility of bad ventilation, uncleanliness and dust. In one clinic at the Henry Phipps Institute during the past year, of 234 cases of tuberculosis, there were twenty-three tailors, nineteen mill-hands (operators upon machines), nine cigarmakers, six weavers, six seamstresses and six clerks—these six occupations supplying almost thirty per cent of the cases treated.

In the family history, we find most frequently perhaps evidence of exposure to contagion. We should have a record of the age and health of each living member of the preceding, immediate and succeeding generations. One is not infrequently able to trace infection to some near relative who has been coughing and expectorating for years, who has a chronic form of the disease, which has never been recognized, and who may live long after the victims of his ignorance or carelessness have been buried. The record of family deaths, with the ages of death, the fatal illnesses and the dates of death, is still more prolific of interesting facts. In drawing our conclusions, however, we must remember that all tubercle bacilli, even the most virulent forms, lose their vitality in about six months, if we are to accept Cornet's statement based upon Kitasato's experiments. Therefore, if we are to establish a connection between the condition of our patient and the disease causing the death of a relative, we must be sure that the exposure was either before the death or very soon after. In cases in which there is obscurity as to the source of contagion, careful inquiry as to the health of the more remote relatives will often be profitable. When the patient is married, the health of the consort and of the consort's family is of interest and importance. A number of cases can be gathered from the literature of tuberculosis, in which a husband or wife suffering from a chronic form of the disease, before succumbing to it, has infected and buried two or more successive consorts.

The question of house infection will naturally be considered in connection with the family history. The fact that tuberculosis is a house disease has been conclusively demonstrated. Therefore, a careful questioning of the patient as to the houses he has occupied during the period of possible infection, together with the character and health of the previous inmates, is often productive of definite results.

The personal habits of a patient have considerable weight in fixing the time and manner of contagion. It is generally admitted that any vicious mode of life, which consumes vital powers and lessens tissue resistance, is predisposing to the disease. Alcoholism, for instance, certainly produces a fertile soil for any infection, and perhaps most frequently for the tubercle bacillus.

When we come to consider the history of previous diseases, we are getting close to the first manifestation of specific activity. When the patient gives a history of a comparatively recent attack of malaria or typhoid fever or pleurisy or pneumonia or influenza, from the effects of which he has never fully recovered, he may be telling only of the acute illness which left him with a weakened system, an easy prey of tuberculous infection. How frequently, however, we can say, with almost absolute certainty, that the so-called malaria, with its fevers, sweats and slight bronchial irritation, was an acute manifestation of tuberculosis. This mistake in diagnosis is the one most frequently met with in clinics devoted to tuberculous cases. The same statement is true to a less degree of the history of a recent attack of typhoid fever, where again the fever, prostration, digestive disturbances and respiratory symptoms have been tuberculous; of pleurisy, which, when primary, is very frequently tuberculous; of pneumonia, with its almost identical clinical picture; and of influenza, that convenient term for any respiratory affection not easily classified. Other diseases which may be of especial interest in the previous history are diabetes, syphilis, gout and rheumatism; and, in childhood, measles, pertussis, scarlatina and diphtheria. The record of traumatism, especially such as would injure the thorax or cause a long confinement to the bed or room, is often significant.

When we reach this point in our investigation, we are in a position to estimate, with a fair prospect of success, the approximate duration of the disease. If we have a definite source of infection, with a history of symptoms beginning within a few months after the period of contact, the task is easy. We must always remember the extreme chronicity of the disease, and must not hesitate to go back a decade or more in order to find the source whence the sequence of symptoms originated. In this attempt to fix the probable duration of disease, we can hope for no direct assistance from the patient, as his idea of the origin will rarely include more than the beginning of the present acute exacerbation. We must bear in mind, moreover, that the determination of duration is going to affect our prognosis. The fact cannot be disputed that patients who have had tuberculosis for a long time, and who show only moderate involvement, respond to treatment better than do the more rapidly advancing cases. Whether this can be attributed to superior strength of constitution or to an acquired immunity it is impossible to say, although the trend of modern investigation seems to point to the latter as the correct view.

In considering the subjective symptoms, we should first record the time when the first sign became manifest to the patient. Usually a very careful inquiry must here be made, as the patient will easily overlook a gradual loss of weight or strength, or a slight morning cough with expectoration. Next, hemoptysis, whether slight or copious, and when first apparent, must be noted. If pain is present, its location and character are of interest. The character of the cough, whether slight or excessive, worse night or day, should be recorded; also the amount, character and color of the sputum. Almost every patient will complain of some dyspnea, slight or marked; and we should make note of how this dyspnea is produced, whether only at night, and in paroxysms (asthma), or when lying down (cardiac disease); whether it is continuous, or appears only on exertion. Is hoarseness present? If so, is it persistent or temporary? The presence of chills, night sweats and edema should be noted.

The condition of the gastrointestinal tract should be carefully investigated, for upon its integrity and efficiency we must largely depend in the modern treatment of tuberculosis. The appetite, the condition of the stomach, whether any dyspepsia or nausea is present, the condition of the bowels, where looseness may possibly indicate intestinal involvement—all these inquiries and records are of vital importance. If the patient is a woman, the periodicity and character of the menstrual flow, or its failure to appear, should be noted. The presence of leukorrhea and its duration is also a matter of interest, because of the theory held by some of our prominent specialists to the effect that a leukorrhea is often indicative of a primary tuberculosis of the uterus or the tubes. Finally, of the subjective facts, we must inquire concerning the previous weight of a patient, recording his best weight and its date, the average weight in health, and the lowest weight since the beginning of the illness. A loss of one-third of the highest weight recorded is a basis for the gravest prognosis.

It is not possible in the scope of this paper to speak in detail of the recording of all the objective symptoms, the results of examination. It is of vital importance, of course, to keep records of the weight, pulse, temperature and respiration for each visit, as these symptoms are the best guides in prognosis and treatment.

It may be said that in an outline for history-taking such as has been given, there are entirely too many details for a practical man, who wishes to make a short cut in his diagnosis. We must remember, however, that careful study of every case of tuberculosis is of importance in the great struggle against the disease and the assistance of every man is needed. Moreover, with a system carefully mapped out, a complete history of any case can be made in a half hour.

The outline followed in this paper is in general the one adopted and now in process of development at the Henry Phipps Institute.

The Diagnosis of Incipient Pulmonary Tuberculosis.

BY GEORGE WILLIAM NORRIS, A. B., M. D.

So much has already been aptly said and well written upon the diagnosis of incipient pulmonary tuberculosis, that I can hardly hope to bring forward any new or original thoughts on the subject. I shall try, however, to emphasize some facts which have been indubitably proved, but which are at present inadequately recognized.

Unfortunately the onset of tuberculosis is accompanied by such slight symptoms, that when the patient presents himself for treatment, several months have usually elapsed since the implantation of the tubercle bacillus first occurred; but a recognition of the disease even at this time is, as a rule, sufficiently early to justify the expectation of a cure.

The most common symptoms of pulmonary tuberculosis are: loss of bodily weight and strength, with failure of appetite and a tendency to become easily fatigued—a symptom complex which is generally summed up by the expression "run down." It is a safe axiom to assume that every hemoptysis is tuberculous in origin until proved otherwise; and a similar rule may be laid down for an attack of bronchitis, which without evident cause lasts more than six or seven weeks. A mode of onset which is fairly common, but by no means generally recognized, is that of pain and stiffness in the joints. In these cases the lungs are often not examined, and the patient treated with various antirheumatic remedies without benefit. Observation is teaching us that quite frequently chronic arthritis is of tuberculous origin; and certainly arthralgic pains and peripheral neuritis are very common in tuberculosis of the lungs, as are also slight pain in the shoulders and back, and a vague sense of oppression or discomfort in the thorax. Distinct pain in the chest, due to a pleuritis, is usually not an especially early manifestation; neither are chills, fever, or night sweats, at least not when these reach sufficient proportions to be complained of by the patient. Slight fever, however, of which the patient is unconscious, especially if recurring regularly towards evening or after exertion, is very suggestive. This pyrexia is, as a rule, very slight in amount; being perhaps only one-half or one degree above the normal, on which account it is often disregarded. Night sweats, too, are often trivial; they may be confined to the axillæ, and be attributed to an abundance of bed-clothes. Vasomotor paresis and cardiac erethism are frequently encountered; the former manifesting itself by transient erythema and sudation; the latter by tachycardia, which is still more increased by slight exertion or mental excitement: this acceleration of the pulse accompanied by dyspnea on exertion is very characteristic. Prolonged or frequent hoarseness should always be carefully investigated, as should also dyspepsia, prolonged diarrhea or other gastrointestinal symptoms. Cessation of the menses in women does not usually occur until the disease is considerably advanced. It should always be borne in mind that pulmonary tuberculosis—especially when the infection is a simple one—may not only exist, but even be well advanced, without the patient having been conscious of cough. All attacks of pleurisy should be treated as "suspects." A large proportion of these cases subsequently develop tuberculosis of the lungs, and have a similar origin. If effusion is present the aspirated fluid may be shown to contain tubercle bacilli, this being most accurately demonstrable by animal inoculation.

Careful questioning in regard to the patient's personal and family history will often beget information of the most useful character. In about two-thirds of the cases the source of the infection can thus be learned and valuable data obtained as to the amount of time which has elapsed since the primary implantation took place; from which deductions may be drawn regarding the course which the disease has, and probably will run. A second attack of supposed typhoid fever or an unusually protracted siege of influenza will often indicate the time when the tubercle bacillus first became pathologically virulent.

Attention has often been called to the habitus phthisicus—a flattened, elongated chest with prominent clavicles and scapulæ, glistening bluish-white scleræ; dry, fine, brittle, lusterless hair; sunken or hectic cheeks, a sharp nose, mydriasis, a red line on the gums, and other well-known signs. Any or all of these may be present—although usually not in early cases—and may be of help in making a diagnosis, but their absence should never throw us off our guard. Distinct tuberculous lesions are often found in apparently well-nourished and robust individuals. The presence of slight spinal curvature, or of scars on the neck, the result of a lymphadenitis in early life, are much more important findings. Physiologic sufficiency of the thorax is more to be looked for than mere anatomic configuration.

PHYSICAL SIGNS.

At the very outset I should like to emphasize the necessity, in every case, of making an entire and absolute exposure of the chest when making a physical examination. It is often stated that the majority of heart lesions may be correctly diagnosticated by inspection and palpation; but in no phase of internal diagnosis can more be learned from inspection alone than in pulmonary tuberculosis. Two reasons why this disease is so frequently overlooked are, that the lungs are examined through the clothing and that the stethoscope is not employed. The latter is no less essential than the former; not only for careful localization, but in order to auscult certain regions at all; notably the supraclavicular fossæ, and the axillary apices—two of the most important regions.

Inspection of the chest should be made under good illumination, and care should be taken to have the shoulders lowered and the muscles of the shoulder girdle relaxed. By standing alternately at a little distance in front of the patient, and again by looking over the shoulders from behind, changes in the respiratory movements can be readily detected. On the affected side diminished or delayed expansion will be found, perhaps also restricted diaphragmatic excursion, the latter being due either to pain or to adhesions of the pleura. Supra and infraclavicular depression, or subclavicular flattening will often indicate the location of the lesion. Inequality of thoracic expansion can be very readily determined by means of a tape measure in which the ascending scale of inches is laid off in each direction from the middle. Distinctly restricted movement of one side of the chest without evident skeletal deformity should make us very strongly suspect tuberculosis.

Palpation is perhaps the least valuable of the four routine methods of investigation; doubtless because a thickened pleura vitiates the physical signs as evinced by fremitus. As a rule, however, corroborating evidence to that obtained by inspection will be produced, especially in regard to the amount and relative extent of the expansion.

Percussion usually elicits a change of resonance which may range from slight impairment to absolute flatness; the note depending largely on the character, extent and depth of the pulmonary involvement, as well as upon the amount of pleural thickening or compensatory emphysema present. The apices of the lungs above the clavicles being near the surface should always be lightly percussed. Deep-seated lung involvement requires forcible percussion to elicit changes in resonance. The use of the fingers alone in percussing is to be preferred to artificial pleximeters owing to the very valuable sense of resistance which is thus retained; at times, however, slight changes in pitch can be more easily detected by the use of an ivory instrument.

A careful comparison of corresponding areas should always be made, bearing in mind that under normal conditions the resonance is usually more marked in the right chest. If percussing the anterior surface, the patient's arms should hang laxly at the sides; if posteriorly, the hands should be placed on the opposite deltoids; if in the axillary line, they should rest upon the head, the elbows being thrown slightly backwards. As far as possible muscular relaxation should be attained, and the patient's head be held in the same planes as the body.

Percussion over a tuberculous area frequently produces pain, especially if there is marked pleural involvement; when performed over a cavity it is often productive of cough and expectoration; the latter phenomenon when occurring is, I think, very suggestive of a vomica. If the lesion is deep-seated and compensatory emphysema exists, hyperresonance may replace impairment. Abrams especially insists that tympany and not dulness is the note most often encountered in early tuberculosis.

In the accurate differentiation of the percussion resonance, the personal equation enters largely into account. An ear which readily analyses musical notes will always be more expert in pulmonary diagnosis, other things being equal; but in every case special education and practice are necessary. It is not enough to be able to distinguish changes in sound; we must also be able to recognize the amount of their deviation from the normal, and to interpret their pathologic import, if such they have. It is a safe plan to begin percussing over a part of the lung which we know to be healthy, and gradually approach the part which we suspect to be diseased. In this way we refresh our memory as to what true resonance is, or at least measure the extent to which it exists in the individual in question.

Auscultation reveals the most important information. Before resorting to it, however, it is well to spend some time in instructing the patient to breathe properly, "a little deeper than naturally;" and seeing to it that he does so, before listening to the chest. This procedure is very time-saving in the end, and eliminates many possible sources of error. If the patient's neck is craned forward or backward, and in some cases even in a straight position, raucous, throaty sounds will be transmitted to the chest which may closely simulate bronchial breathing, and be the cause of much confusion. Stenosis of the trachea or pressure upon the bronchi, from aneurysm, tumor or enlarged bronchial glands, may produce a similar result. These cases are differentiable from tuberculosis through the equal bilateral quality of the sounds produced and by the absence of changes in resonance. Expiration should be passive, no voluntary expiratory effort being made. Patients suffering from any nasal obstruction should breathe through the oral cavity.

The entire chest must of course be carefully ausculted, but especial attention should be paid to the apices above and below the clavicles, anteriorly; the supraspinous fossæ and the areas which underlie the inferior extremities of the scapulæ, posteriorly. The latter areas correspond to the fissure between the upper and lower lobes. If rales are absent, the patient should be made to cough forcibly and take deeper inspirations, a procedure which will often cause doubtful findings to become clear pathologic manifestations. In the early stages of pulmonary tuberculosis glaring physical signs must not be expected. Expiration may be but slightly prolonged, or perhaps only roughened; in some instances, an unduly suppressed and indistinct respiratory murmur is equally indicative of disease. Bronchial breathing does not occur until marked infiltration has taken place. Fine, hair-like, crepitant rales; heard especially at the end of inspiration, localized to a certain area, though not necessarily the apex, are very characteristic of tuberculosis; but often much coarser rales may take their place or be commingled with them. There is much truth in the hackneyed adage that "unilateral catarrh is not catarrh." Due but not too much allowance must always be made for the bronchovesicular respiration which is normally encountered, especially in women, posteriorly over the bronchi; and anteriorly at the second right costosternal articulation. Tuberculous foci in the latter location have to be determined by the percussion changes, the presence of rales, the data obtained by inspection, etc. The normal breath-sounds at the right apex, similarly to the resonance, are more intense than on the opposite side. Pleural friction sounds are not infrequently heard over affected areas, coincidently with rales; they are usually low in pitch, rough and grating in character, unchanged by coughing, intensified by deep breathing, and remain localized for extended periods of time. Such frictions may be simulated by the sound which the scapulæ sometimes produce in rubbing over the dorsal fascia; the latter, however, can be made to disappear by changing the position of the shoulder blades.

As has been already stated, great care should be exercised to secure complete relaxation of the thoracic and dorsal muscles, because the sounds produced by contracting muscle fibers may considerably modify the character of the respiratory murmur, and as a patient who is straining or even exerting his voluntary muscles will not breathe in a soft, natural and effortless manner.

But little attention should be paid to cog-wheel respiration. This phenomenon may occur from irregular contraction of the respiratory muscles, and is very common in excited or neurotic patients. It is noted in many nontuberculous cases, especially anteriorly near the heart, and in lung areas overlying the large vessels. Subclavian murmurs are frequently observed; they usually appear or become intensified toward the end of a deep inspiration, and are apparently due to constriction of the vessels by consolidated lung tissue or adhesions. When heard they are perhaps suggestive, but by no means pathognomonic of tuberculosis. Accentuation of the pulmonary second sound is a very constant finding, even in early cases. Cardiac murmurs are by no means rare; they may be due to anemia, relative insufficiency of the valves or otherwise abnormal heart action. Distinct organic valvular lesions, while by no means excluding tuberculosis as formerly supposed, are not very frequent complications. Cardio-respiratory murmurs are often met with; they possess neither diagnostic nor clinical significance.

The detection of tubercle bacilli in the sputum is satisfactory evidence as to the etiology of the condition; their absence, however, is no disproof of it. The sputum of advanced cases, with well-marked evidences of cavity formation, often has to be examined a number of times before tubercle bacilli can be demonstrated; and in incipient cases often twenty or thirty examinations are required before a positive result can be obtained. Truly incipient cases have, as a rule, no expectoration whatsoever, the cough itself being often unnoticed by the patient. The prevalent tendency to defer the diagnosis of tuberculosis until bacilli have been found in the expectoration is most unfortunate for the patient and often humiliating to the physician. No hesitancy exists in telling a patient suffering from cardiac or renal lesions of his true condition and insisting upon hygienic reformation; but the tuberculous individual, who harbors a far more curable disease than either of these, is allowed to remain in a benighted state regarding his malady until a physical breakdown brings to his own realization the fact that he is afflicted with more than a transient process. The symptoms, clinical history and physical signs are in many cases sufficient to justify a diagnosis of pulmonary tuberculosis, without an examination of the sputum at all; and until this fact is more generally recognized, the future, like the past, will witness the transport of a remediable incipiency to a hopeless advancement before the diagnosis is pronounced. The demonstration of tubercle bacilli in the sputum may be considerably abetted by centrifugation, or by the more recently introduced method of inoscopy—which consists of liquefaction of the sputum by a process of digestion before centrifugation. Animal inoculation, when feasible, is also of assistance, but requires time and especial facilities. In the light of modern belief, the infrequency of tubercle bacilli in early cases is easily explained. Nearly all investigation is tending to prove that this microorganism is never inhaled directly into the air-vesicles, and that pulmonary infection when present has always been preceded by an infection of the bronchial lymph nodes; the portal of entrance having been the bronchial or intestinal mucous membrane, the tonsils, etc. This being the case, the bacilli have literally to come through the lungs before they appear in the expectoration, a process which does not occur until necrosis of the pulmonary tissue has taken place. Large numbers of bacilli, unless continuously found, are not necessarily an indication that the disease is far advanced. They may be due to the breaking down of a small nodule, which happened to occur at the time when the sputum was collected for examination.

The tuberculin reaction is a useful adjuvant in diagnosis, to be held in reserve. While not infallible as a positive test, its absence precludes the presence of tuberculosis. The value of serum diagnosis is still *sub judice*. The X-ray, laryngeal mirror, and occasionally the ophthalmoscope, have been of distinct value in diagnosis, but unfortunately expert testimony is required to make the evidence thus obtained of material weight.

DIFFERENTIAL DIAGNOSIS.

The conditions which most closely simulate incipient pulmonary tuberculosis are syphilis, influenza and mitral disease, especially slight grades of stenosis; healed tuberculous lesions, simple streptococcic infections of the lung, and nontubercular fibrosis.

Much diversity of opinion exists as to the frequency with which *syphilis* affects the pulmonary tissue, but prevalent belief is to the effect that this is more commonly the case than is generally supposed. Aside from a history of this infection, localized evidences such as cutaneous scars or other tertiary lesions may be present. Syphilis usually begins at the hilum of the lung. It may spread upward, but more usually affects the lower lobes. Tuberculosis begins just below the apex, and generally affects the subjacent lobe before spreading to the opposite side. In syphilis there is, as a rule, equal bilateral consolidation, often without rales; emaciation, expectoration and fever are less marked, hemoptysis is more rare. The patient seems much less ill than would be the case from an equal amount of tuberculous pulmonary involvement. The tuberculin test is of no value in these cases because syphilitic patients sometimes give a positive reaction. A laryngeal examination may be decisive if this organ is involved; but generally the diagnosis hinges upon the sputum examination and the therapeutic test—tuberculous patients being nearly always made worse by the administration of mercurials and potassium iodid.

Influenza and pulmonary tuberculosis are more frequently confused; but here the protracted course of the latter, the presence of a slight regular evening rise of temperature, night sweats, hemoptysis, progressive emaciation, accentuation of the pulmonary second sound, localization of the physical signs and tubercle bacilli in the sputum are features of differentiation. As has already been stated, many cases of supposed influenza are acute exacerbations of pulmonary tuberculosis. The mere recurrence of such attacks, especially if subsequently the health of the individual remains impaired, should make us very suspicious of tuberculosis. If a diffuse bronchitis coexists it is often necessary to defer a positive diagnosis until the latter has cleared up.

Slight grades of *mitral stenosis* may render the diagnosis for a considerable time uncertain. In either condition we may have a rapid pulse, cough, expectoration, rales, easily provoked dyspnea and fatigue, gastric symptoms, accentuation of the pulmonary second sound, hemoptysis, etc. But here again cyanosis with marked right-sided cardiac enlargement, diffuse bilateral involvement of the lungs, most marked at the bases, without pyrexia, as well as the absence of night sweats, are evidence in favor of a heart lesion. The blood pressure in mitral stenosis is apt to be slightly above the normal, while in tuberculosis arterial hypotension frequently exists. Precordial thrills are commonly encountered in the last-named disease, owing to general emaciation or to retraction of the lung; but when unaccompanied by mitral stenosis they are not presystolic in time.

Healed tuberculous lesions, if complicated by an acute infection such as bronchitis, require more or less prolonged observation, frequent examinations, and careful consideration of the anamnesis, subjective symptoms, and general health.

Nontuberculous fibrosis is to be recognized by its equal bilateral character, absence of fever, hemoptysis, tachycardia, night sweats, etc., but especially by the disproportion between the amount of lung tissue involved and the apparent illness of the patient, as well as by the absence of tubercle bacilli.

Some of the most puzzling cases are those which occur in old people, in whom the respiratory sounds are suppressed, or in those who are known to have emphysema, with perhaps cardiac and renal degeneration as well, in which the question arises as to the additional presence of an active or a healed tuberculous lesion. Such cases necessitate repeated physical examinations and the employment of all available diagnostic means. Fortunately the diagnosis in these instances is of less moment than when occurring in patients of an earlier age; inasmuch as the tuberculous process is apt to run a slow and protracted course, so that under reasonable hygienic conditions the length of life is not materially shortened thereby.

Simple *localized lobular streptococcus infections* of the lung, such as have been described by Finkler and A. Wassermann,* may so closely simulate tuberculosis as to be differentiable only by the continued absence of the tubercle bacillus in the sputum, and a negative tuberculin reaction. Such cases, compared to the prevalence of tuberculosis, do not occur with sufficient frequency to make their similarity of much clinical importance.

It is always well to defer a positive diagnosis in cases complicated by pleural effusion, bronchitis or any other acute infection. A certain number of cases are encountered which baffle even the most expert diagnostician for a time, but repeated and careful examinations will usually solve the perplexity.

The diagnosis of incipient pulmonary tuberculosis should be within the power of every physician. The vast majority of cases require neither special facilities nor unusual abilities for their detection. It is largely a question of care and common sense, together with a reasonable degree of efficiency in medical knowledge and of skill in physical diagnosis.

It is a deplorable fact that many practitioners to-day are either unable or unwilling to diagnosticate pulmonary tuberculosis in its early stages. This is in part due to the general skepticism which exists to a greater or less extent in regard to the curability of the disease. To some members of the profession, the fact that the patient makes a satisfactory recovery at home in the course of a few months is a proof that the disease was not pulmonary tuberculosis; notwithstanding the fact that nearly every human being has harbored some tubercle bacilli in his system at some stage of his career, and that autopsy statistics reveal distinct tuberculous lesions in nearly one-half of all cases dying from other diseases. The frequency with which supposedly incipient cases of tuberculosis are sent to the examiners of the White Haven Sanatorium, which upon examination are found to have two, three, or even more lobes of the lung distinctly involved, is almost beyond belief. Nontuberculous cases are not often diagnosticated as tuberculosis; but the reverse, unfortunately for the patient, is a common occurrence. It is time for the medical profession at large to realize more fully that attacks of chronic bronchitis, bronchopneumonia, influenza, typhoid fever, etc., less frequently "go into consumption" than that they are manifestations of tuberculosis from the onset. "It is probable that if the physician resisted his life-long habit of optimism and erred in the opposite direction in cases of suspected tuberculosis, the mortality list would be shorn of a measurable proportion of its bulk."—Butler.

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* Quoted by Fränkel, *Spezielle Pathologie und Therapie der Lungenkrankheiten*, 1904

The crusade against tuberculosis, which is having an awakening in this country, cannot be efficiently carried out by a few specialists alone. Neither will the multiplication of sanatoria throughout the land be of benefit to the population as a whole, or bear such fruits as will justify their erection, until the medical profession at large is able to recognize pulmonary tuberculosis in its incipiency and is willing to send patients to these sanatoria, who are still in a curable stage.

The Diagnosis of Advanced Pulmonary Tuberculosis.

BY FRANK A. CRAIG, M.D.

In taking up a subject which presents so many varied forms it becomes necessary to group the different types together in some systematic way in order to bring it within the limits of the present paper. The classifications according to distinct clinical types or depending on distinct pathologic conditions are too elaborate, except for a detailed study, the cases running one into another so closely and changing so constantly. The classification of Turban has been selected for the reason that, although somewhat crude and restricted, it possesses the advantage of simplicity, and further takes into account not only the local conditions, but also the constitutional effects of the disease.

Turban divides the cases into three classes. Class I. Mild cases, infiltration of at most one lobe or two half lobes. Class II. Mild cases, infiltration of at most two lobes; or severe cases, infiltration of at most one lobe. Class III. All cases not included in Classes I and II. This paper will only consider Classes II and III, considering them together.

The diagnosis of tuberculosis has passed through various phases or epochs, determined by different important discoveries which had marked influence upon the methods of that period. Perhaps the first great step in more recent times was brought about by the work of Laennec, which started the era of diagnosis by "physical signs," at which time the diagnosis was based entirely upon the examination of the patient, with a tendency to disregard the history of the case, and the symptoms. Later under the stimulation of Koch's great discovery it suddenly passed into the era of "bacteriologic diagnosis," at which time the enthusiastic supporters of this method disregarded physical signs and depended entirely upon the finding of tubercle bacilli in the sputum for their diagnosis. The influence of this idea has not been entirely overcome in the present day. With improvement in the method of treatment, which emphasized the importance of early diagnosis, every effort was bent upon discovering some absolute means of early diagnosis other than those in use. Thus the era of "early diagnosis" is characterized by various methods of diagnosis, each with its group of adherents all more or less enthusiastic. Even the most devoted followers of the Röntgen-rays, tuberculin reaction, examination of the cellular elements of the blood, blood-serum agglutination tests, study of the temperature after exercise, and chemical examination of the urine as a means of diagnosis, emphasize the importance of merely considering them in conjunction with a thorough study of the case itself.

The age, sex, habits, social condition and general history have of course the same bearing in an advanced as in an early case, and I will only mention one or two points which have special significance in the former. The exact, or as nearly exact as possible, determination of the duration of the disease is important in its relation to the amount of involvement, when considering the nature of the condition present. This is true also of the general surroundings and mode of life of the patient. For example, a patient who has only slight involvement of long duration under unfavorable circumstances is distinctly different from a patient with extensive involvement of short duration under favorable circumstances. This point belongs perhaps more to a consideration of the prognosis and treatment, but a diagnosis is of little practical value unless it includes not only the presence of, but also the character of, the involvement.

In describing the symptoms I have tried to give, wherever possible, the proportion of cases of tuberculosis in which the different phenomena occur. The figures are taken from the statistical reports of Roepke and Turban, for the reason that these two authors use the same classification, to which I have already referred.

The symptoms to be considered are cough, loss of weight, hemorrhage, night sweats, chest-pains, dyspnea and cardiac palpitation.

Cough. This is perhaps the most frequent symptom in advanced cases of tuberculosis, it being extremely rare for cases to proceed to this stage without more or less marked cough. That cases may rarely go on to even cavity formation without severe cough should never be lost sight of. It is in no way characteristic, varying in time, character and degree. The expectoration also varies greatly, both in quantity and appearance, from the thick, tenacious, nummular sputum to fetid purulent material. The morning cough with expectoration, due to the retention of secretion over night, may first attract the patient's attention to the presence of cough, but is not distinctive. Both authors quoted give this symptom as occurring in 100 per cent. of cases in this stage.

Loss of weight is as common a feature as the foregoing symptom. It varies from merely slight loss, which it may require very careful questioning to bring out, to marked emaciation. It is generally progressive with occasional slight remissions under favorable circumstances. This was also present in 100 per cent. of cases.

Hemorrhage. When it can be definitely determined that the hemorrhage is from the lung itself, this is a most valuable sign. It may not infrequently be the first symptom to call the patient's or the physician's attention to the lungs. The nature of the hemorrhage in regard to its cessation, whether spontaneous, following violent effort or trauma, is important. The statistics quoted by Osler in regard to hemoptysis in general give interesting figures. Of apparently spontaneous hemoptysis about 86 per cent. are due to tuberculosis, of those following exercise about 74 per cent. are due to the same cause, and of those following trauma 50 per cent. are not due to tuberculosis. On the other hand, 70 per cent. of Roepke's cases had hemoptysis and 61 per cent. of Turban's. Mitral stenosis as a cause of hemoptysis is not uncommon and should always be excluded.

Night sweats. Although not quite so frequent as the former symptom, they are not uncommon, occurring in 55 per cent. of Turban's cases. They may occasionally be very severe in character and form a most distressing symptom. They occur most frequently in the early morning hours.

Chest-pains. These may occur between the shoulder blades, in the shoulders, or in the sides of the chest, the two first mentioned occurring more frequently in the early cases. The pains in the chest itself are much more common in the advanced cases, due either to an extension of the tuberculous process to the pleura or to some associated inflammatory process.

Dyspnea and cardiac palpitation, although in no way distinctive, are not uncommon symptoms. The former frequently may cause the patient great distress, and does not seem to bear any constant relation to the amount of lung tissue involved.

Fever. This is not a constant feature, but the cases are extremely rare that do not show some elevation of temperature at some time during the twenty-four hours. This elevation may be slight and detected only by careful methods in using the thermometer and frequently goes undetected when these precautions are neglected. I refer to insisting upon the patient keeping the thermometer well under the tongue, the lips kept tightly shut, not taking the temperature directly after patient has taken anything hot or cold and being careful to leave the thermometer in the mouth from six to ten minutes. The type of fever varies greatly not only in different cases, but in the same patient at different times. An afternoon or evening rise with morning remissions or intermissions is by far the most common. This rise may be very high at times, with marked intermissions, and shows, as a rule, decided irregularities. Some writers lay great stress also upon a premenstrual rise in the temperature in tuberculous female patients, and others upon a rise in temperature following exercise.

Pulse. A rapid pulse is the rule, not always proportionate to the degree of fever or even the amount of involvement. Cases which show very slight rise in temperature, showing frequently a pulse of 100, 120 or even 130. The character of the pulse is not typical, although a full but soft and compressible pulse is commonly noted.

Physical Examination. In the examination of the patient we have the most important method of diagnosis. The signs elicited vary greatly in character and require not only careful but repeated examinations to determine their significance.

Inspection. By this means one notes the general appearance of the patient, character of skin and mucous membranes, amount of subcutaneous fat and general muscular development. More important, however, are the configuration of the chest and expansion of same during respiration, noting the rate, excursion and a comparison of the two sides. There has been so much stress laid upon the long, narrow, phthisinoid chest, with its vertical ribs, narrow costal angle, and projecting scapulae that I merely mention it in passing. It is met with fairly frequently; Roepke shows 26 per cent. Another type of chest is the chest with a narrow anteroposterior diameter. Any form of chest, however, may be the seat of tuberculosis. Localized retraction or tardy expansion either of one or both apices, especially depression above or below clavicles, are also valuable when present, and when sought for carefully will be found not infrequently.

Palpation is mainly useful in confirming inspection, especially in detecting diminished expansion, and in estimating vocal fremitus, the latter being increased over consolidation or cavity, and diminished over collections of fluid or thickened pleura.

Percussion. On percussion the note will vary according to the amount of infiltration, consolidation, excavation of or effusion into the tissues beneath it. Where the infiltration is disseminated, and there is still a comparatively large amount of air-containing lung-tissue between the tubercles, one may get an impairment of the normal note which is extremely difficult to determine. In percussion of the apices one obtains the most important information, as at this point the involvement is further advanced and the signs, as a rule, are more evident. The percussion of the clavicles, supra and infraclavicular fossæ, therefore, gives one the most decided results; especially is this true if only one lung is affected, and one has the opposite lung for comparison. The difference between the two being brought out best by getting the patient to take a deep breath and then hold it, when the percussion at corresponding points on the two sides may show the impairment or dulness to be quite striking. Occasionally the dulness posteriorly may be more evident than anteriorly, and the percussion of the supraspinous and interscapular spaces should never be omitted. The note obtained may vary from a slight impairment to dulness, according to whether one is dealing with a disseminated infiltration or a consolidation. Over deep-seated cavities with consolidation around them one may get a note which varies very little from the normal or may even be dull. Over superficial cavities, however, the note is hyperresonant or even tympanitic. When cavities are quite superficial one occasionally finds the typical cracked-pot sound. It is of importance in percussing the chest that the muscles should be well relaxed; this is best obtained by having the patient in a comfortable sitting position with the shoulders "dropped."

Auscultation. The auscultatory phenomena are so numerous that I will merely mention those sounds most closely identified with the varying degree of involvement. With slight infiltration one may get merely a prolongation of the expiratory murmur and feeble breath-sounds or occasionally harsh respiratory murmur, which may be jerky or "cog-wheel" in type. Rales when present are generally fine and crackling, and may be only noted at end of deep inspiration after a cough. As the amount of infiltration advances the respiratory murmur changes, expiration becomes more prolonged and higher-pitched until consolidation occurs, when it becomes bronchial in character. The rales also become more numerous, as a rule, and are larger and more moist in character. Over cavities of moderate size the breath-sounds are cavernous or occasionally may be amphoric, and rales are large and bubbling. Vocal resonance is increased over any infiltrated area (except where thickened pleura or pleural effusion intervenes) in direct proportion to the amount of involvement until consolidation is reached, when bronchophony or whispered pectoriloquy may be found. The latter is, of course, heard best over cavities, especially when superficially situated. Pleuritic friction rubs may be frequently noted and are often very hard to differentiate. Considerable consolidation around a bronchus may simulate a cavity very closely.

As to the value of percussion and auscultation in making a diagnosis, some authors claim greater precision in one and some place more value on the other. It is a personal matter entirely, which must be settled by each one for himself. A careful application of all the methods of physical diagnosis will perhaps give the best results.

Urine. Although the examination of the urine may give very few data in this condition, it should never be omitted. Glycosuria and albuminuria, while not common, occur not unfrequently, the latter occurring in the later stages, due probably to some degenerative change in the kidney. A positive diazoreaction is a very unfavorable sign in tuberculosis; except as an aid to prognosis the test has little value in this condition. Ehrlich's dimethylamidoazobenzaldehyde reaction in the urine is not typical of tuberculosis, as it occurs in numerous other pathologic conditions. Another condition suggested as being indicative of tuberculosis is phosphaturia alternating with albuminuria.

Sputum. In the examination of the sputum we have a most valuable and positive aid in the diagnosis, and one fortunately that is very easily carried out. The presence of tubercle bacilli in the stained expectoration is an absolute diagnostic sign of tuberculosis. The contrary, however, does not hold good, and the absence of tubercle bacilli from the sputum does not exclude this condition. A frequently repeated and carefully made examination of the sputum will in many instances reveal their presence. Roepke found the bacilli present in 67 per cent. of cases in Class II, and in 100 per cent. in those of Class III. Turban found them present in 89 per cent. of cases in Class II, and in 98 per cent. of cases in Class III.

Tuberculin. This agent has been highly recommended by numerous observers, more, however, as a means of confirming the clinical examination than as a means of diagnosis in itself. It is useful mainly in early cases, as the results are not so good in the more advanced cases. Its field of usefulness is somewhat limited, however, as it requires keeping the patient under very careful observation for a week to ten days, although one investigator has used it in dispensary cases with fairly satisfactory results. It has not been used to any great extent owing to the prevalent idea that it may disseminate a localized tuberculosis.

Blood. The examination of the corpuscular elements of the blood gives very little assistance. The blood counts and findings are not constant. Especially is this true in the early stages, when it would be of most value. The absence of eosinophiles, however, has an unfavorable, and their increase in number a favorable prognostic value.

The serum agglutination test of Arloing-Courmont is unreliable, as shown by numerous observers. The technique is also too elaborate for general use, requiring laboratory facilities for its performance.

Röntgen-rays. Although quite satisfactory results have been obtained by the use of this method, it requires a careful special training in order to be of any value at all.

Differential Diagnosis Between Pulmonary Tuberculosis and Conditions Resembling It.

BY H. R. M. LANDIS, M. D.

The conditions simulating advanced pulmonary tuberculosis are so numerous that lack of time will necessitate but a brief reference to many of them. Therefore, I will restrict this paper to those conditions which have caused errors in diagnosis, both by members of the staff of the Phipps Institute and by members of the profession who have referred cases to the Institute.

Most of us have a definite picture of pulmonary tuberculosis in its advanced form, and a case giving a history of loss of weight, cough, expectoration, hemoptysis, fever and night sweats in association with certain physical signs is usually looked upon as most certainly tuberculous.

There are two points, however, which if kept in mind will obviate many mistakes. The first is that pointed out by Fowler, namely, that there is a definite "line of march" taken by the invading tubercle bacillus. The disease almost invariably starts just below the extreme apex on one side and pursues a downward course. The lower lobe of the lung first affected is almost invariably involved before the apex of the opposite side is attacked. This always results in the disease being in a more advanced state at the apex than in the lower lobe.

The second point of importance is the examination of the sputum in all cases of pulmonary disease. While too much stress has undoubtedly been laid on the finding of tubercle bacilli in incipient tuberculosis it can be safely said that too great laxity prevails in similar examinations in what are apparently advanced cases.

Systematic examination of the sputum is insisted on at the Brompton Hospital, and this precaution alone has led to the detection of many obscure conditions.

In taking up the diseases which simulate tuberculosis it may be said that some of them are quite rare and can be dismissed with a word.

Actinomycosis, aspergilosis and hydatid disease depend for their recognition on the absence of tubercle bacilli and the positive identification of the ray fungus, mycelium or hydatid hooklet. The same brevity may be applied to intrathoracic growths which are usually evident from the history, pressure symptoms and physical signs.

Among the common conditions causing confusion is *chronic bronchitis*. This is particularly the case in advanced life, where the tuberculosis often runs a latent course, with a normal or subnormal temperature, and the associated emphysema mask the physical signs. The diagnosis in such cases offers considerable difficulty, and may be impossible without the finding of the tubercle bacillus. There is nothing distinctive of tuberculosis either in the symptomatology or the physical signs. Suspicion as to the true condition may be aroused, however, from the following points: The cough, while worse in winter, never entirely disappears; on physical examination it may be noted that the signs are more marked at both apices or at one apex alone; and in addition a definite history of exposure or family predisposition may be present.

Bronchiectasis.—This is a not uncommon source of error, especially in the diffuse form in which the bronchi of a lobe or even an entire lung may be dilated. The dilations may be sacculated, cylindrical or fusiform. The condition is almost invariably secondary to some prolonged inflammation of the bronchi or to induration or consolidation of the surrounding tissue. Therefore a history of prolonged bronchial inflammation, measles, whooping cough, pleurisy, and particularly pneumonia, is important.

There is no single symptom of tuberculosis which may not be present in this condition, but there are several points which render the diagnosis probable, and with the absence of tubercle bacilli it becomes almost a certainty. Cough, expectoration and dyspnea are the important symptoms. The expectoration is quite characteristic, occurring in large quantities at a time, and particularly on rising in the morning. The dyspnea is variable, depending on the extent of lung tissue involved and the implication of the right heart. Pain in the chest is frequent and important, usually indicating extension of the process to the surface of the lung. Fowler states that clubbing of the fingers is so extreme as to be of value in the diagnosis. In three cases I have seen this was certainly true.

The physical signs in the majority of the cases show the lesion to be at the base or about the root of the lung. Fremitus is usually increased, especially if fibrosis coexists. The percussion note depends on the underlying condition: if there be surrounding emphysema the note will be hyperresonant; if the dilations be large the note may be tubular or tympanitic in character; while if fibrosis be present dulness is the result. The breath sounds are bronchial or cavernous, while whispering pectoriloquy and amphoric breathing are present over the superficial dilation. The râles may be large and bubbling and of a metallic character, or, in the presence of fibrosis, superficial and crackling. The "veiled puff" of Skoda may also be present. I have met with this sign in one case. It occurs at the end of inspiration and gives the impression of a puff of air suddenly entering the dilated portion of a superficially placed bronchus.

When the dilations are confined to an upper lobe the differentiation is more difficult. In bronchiectasis of the upper lobes the dulness rarely extends above the clavicle, and the flattening below the clavicle is slight as compared to that in tuberculosis. The greatest source of error is in those cases in which there are signs of a cavity in the interscapular region. While a tuberculous cavity may exist at this point, it is rare without some evidence anteriorly.

Fibroid Lung.—Also referred to as chronic pneumonia, cirrhosis of the lung and interstitial pneumonia.

Pathologically the condition is characterized by an overproduction of fibroid tissue, which tends to diminish the size of the organ and cause marked retraction of the chest wall. The opposite lung, unless both are involved, shows a marked degree of emphysema. It is believed by some that the pulmonary process is but a part of a general fibrosis, because of the associated arteriosclerosis and contracted kidney sometimes met with. Sir Andrew Clark, Hadley and Chaplin, in their monograph on fibroid disease of the lung, made the following divisions: (1) Pure fibrosis in which there is no tubercle; (2) tuberculofibrosis, a condition primarily tuberculous, but in which extensive fibroid changes have taken place; and (3) fibrotuberculosis, a condition in which the primary state was fibroid, but subsequent infection with tuberculosis takes place.

Pure fibroid disease is not uncommon in children, and in these cases there is generally a history of some catarrhal affection of the lungs, either measles, whooping cough or bronchopneumonia. In adults a history of pneumonia is frequent. Other contributing causes are bronchiectasis, inhalations of irritating substances, pleurisy, syphilis and foreign bodies in the bronchi. A long-standing empyema may cause collapse with subsequent fibroid changes. One such case came to autopsy at the Phipps Institute. Two of the authors above quoted believed the condition was more common in children, while the third had seen more cases among adults. Cough, expectoration and dyspnea on exertion are the symptoms most commonly observed. Marked deformity, as a rule, characterizes the disease. The affected side is retracted; the ribs become approximated, or may even overlap; the spine is drawn toward the affected side, and the heart is pulled out of its normal position, the retraction always being toward the affected side. In right-sided fibrosis the apex beat may be in the fifth interspace in the nipple line on the right side.

The physical signs are variable, and depend largely on the presence or absence of bronchiectasis. When dilations of the bronchi are present the percussion note may be tubular or tympanitic in character; in their absence it is usually dull. With dilation of the bronchi the râles may be bubbling and metallic in character or fine and crackling. The breath sounds may be bronchial or cavernous, or, in the absence of dilations, feeble and distant. The emphysematous condition of the opposite lung gives a hyperresonant note, which may extend beyond the median line of the sternum, and the breathing is perile in character. Basic heart murmurs are commonly present, usually at the pulmonary orifice, and systolic in time.

In differentiating pure fibroid disease from fibrosis with an associated tuberculosis, the presence or absence of the tubercle bacillus is of course the all-important point. In addition, pure fibrosis runs an afebrile course, the constitutional disturbances are slight, and the opposite lung shows no signs of infiltration or consolidation.

Among the older clinicians, *syphilis of the lung* was looked upon as comparatively frequent. Later the existence of syphilitic disease of the lung was questioned unless it could be demonstrated pathologically. In proof of the rarity of the disease is the experience of Fowler, who states that in a careful search among the museums of the London hospitals he could find but twelve examples of syphilis of the lungs, and in two of these it was doubtful. Recently, however, papers by Janeway, Stengel and Berg would seem to indicate that the condition is not infrequently met with.

Pulmonary syphilis may be strongly suspected if a patient presenting the physical signs and symptoms of tuberculosis has no tubercle bacilli in the sputum after repeated examinations, and in addition has evidences of tertiary syphilis. During the past winter I have seen two colored women who illustrate these points. Both came to the dispensary complaining of cough, profuse expectoration, hemoptysis (in one case), night sweats and loss of weight. The physical signs closely resembled those of advanced phthisis without cavity formation, except that in one case the signs were more marked at the base. In one case there were typical syphilitic leg ulcers, while in the other there were scars on the arms and body of a recent rupial eruption. One case has been lost sight of, but in the remaining case no tubercle bacilli have been found, and she is showing marked improvement under potassium iodid. A case reported by Stengel made a complete recovery under the iodid, although he had been admitted to the hospital in a dying condition.

There still remains another condition which experience has shown to be a frequent source of error, namely, *mitral stenosis*. I mention it simply to call attention to the fact that this valvular lesion is a frequent source of blood-spitting. The only cases of mitral stenosis which should offer any difficulty in determining the source of the blood are those in which there is no murmur. In these cases careful examination will usually reveal a faint thrill above the apex beat, accentuation of the second pulmonic sound, a small pulse, and that peculiar quality of the first sound which Da Costa designated as clacking.

In conclusion I wish to emphasize the importance of keeping in mind the definite "line of march" taken by the invading tuberculous process and the necessity of systematic and repeated sputum examinations in all doubtful cases.

DISCUSSION.

DR. WARD BRINTON.—The point which impressed me most in Dr. Norris' paper, which I have been asked to discuss, was the emphasis he laid upon a careful and systematic examination and understanding of all cases of suspected lung trouble. This examination should not be confined to one or two visits, but in cases of doubt should be carried over some space of time, with consideration of temperature, both above and below normal; pulse, and the variations in respiratory sounds. In early cases any diminution of breath-sounds over the suspected portion should be noted, and also any compensatory increase of respiration over the healthy lung. Dr. Norris spoke of the areas of importance in examination with special reference to the supra and infraclavicular regions, but made no mention, I think, of investigation of the upper axillary space—with the arm of the patient elevated. Here, as I was taught by the late Frederick Packard, I have frequently found abnormal sounds which were not elicited at other positions. As regards fremitus, I think that when studied in conjunction with vocal resonance and the qualities of the respiratory sounds, we have a sign of importance in determining whether we have any diminution in resiliency of the lung structure or thickening of the pleura. The sign should, however, be obtained by the more delicate sense of touch of the tips of the fingers, when differences not noted by more gross manipulation may be appreciated. I am convinced that the examination of the lung to arrive at knowledge of tuberculous trouble in its incipiency requires more than average training, and I am sustained in this opinion by the number of pronounced, but undiagnosticated, cases that are so frequently found applying to our dispensaries, suffering with what they think and have been told is only a "stubborn cold." The question is one which, as Dr. Norris has said, requires a careful examination and also an ability to understand the signs when elicited.

DR. HORACE L. CARNCROSS: I think the subject under discussion is not only a question of the presence of tuberculosis, but is largely a problem of pathology. We usually see the disease beginning in the apex behind the middle of the clavicle burrowing down the anterior surface of the upper lobe and involving the middle and lower lobe at its apex before the other side is involved. The disease is usually well advanced in the apex, most likely softening has begun, before there is infiltration in the lower lobe. When you have the lower lobe involved you have simply a different stage in the same class. While all classifications are arbitrary, it seems to me that one that divides the disease into types is the most practical. Osler's division of the cases into fibroid phthisis, chronic ulcerative and acute pneumonic tuberculosis is a rather satisfactory one, and though the types run each into the other, we are nevertheless assisted in some cases in forming an estimate of the state and course of the disease. There are cases, for instance, which begin as fibrous pneumonia, and run an apparently normal course. They begin with chill, pain in the side, dyspnea, rusty sputum and high fever, which continues until the eighth or ninth day, when instead of the crisis of simple fibrinous pneumonia we have irregular fever with possibly sweats and the expectoration becoming bloody and mucopurulent, and it is possible that tubercle bacilli may be found. In remembering that the disease may be thus ushered in we are suspicious and sooner realize that we are dealing with an advanced tuberculosis instead of a simple unresolved pneumonia. No one has mentioned the subject of examination of the sputum for elastic fibers. This is not only a diagnostic sign, but it is of value in showing that a destructive process is going on in the lung, since it is produced by tissue disintegration. The presence of fever also is one of the most important factors in addition to the physical signs in estimating the state of the disease. In the beginning stages of chronic pulmonary tuberculosis there is slight continuous fever, which sometimes disappears. With the beginning of the breaking down we have rising temperature or a rise of temperature may indicate a new focus of disease; a hectic type is often associated with caseation and a mixed infection, and may be due to the action of pyogenic and other bacteria, such as the streptococcus, staphylococcus pyocyaneus, pneumococcus,etc. The introduction of a continued fever may betray a pneumonia. In that respect the fever is a very important point to watch, because it helps us in addition to the physical signs. In a general way the fever indicates a rapid advance of the process or caseation and bears a proportion to these, for the patient during fever generally loses weight, and it is during the afebrile stage that he gains. The rise of temperature is due to the fact that the toxins are being absorbed, and, if continued, causes an increased consumption of the albumin in the blood and tissues, and this in turn causes wasting which again favors the absorption of toxins, and the processes thus act in a vicious circle. Cornet has gone so far as to improvise a thermometer which he leaves in the axilla 24 hours so that the maximum temperature can be noted, for the reason that it is desirable to know the maximum rise which has no definite time of appearing. Since the time of rising is so variable this may be entirely missed if the thermometer is used simply twice or thrice a day.

DR. A. P. FRANCINE: I would like to speak of 2 cases which have recently come under my observation which illustrate very aptly 2 points upon which Dr. Norris laid stress in his paper. The importance of stripping all patients to the waist in order to make a thorough and complete examination of the chest and back, was illustrated by a case I saw at the University Hospital and subsequently showed before the section on medicine of the College of Physicians. From this man's history he had evidently had tuberculosis of the lungs for over a year, dating from a severe attack of grippe from which he had never fully recovered. During this time he had progressive loss of flesh and strength, occasional night sweats, and a cough. Upon several occasions he had spit blood. During this period he had consulted no less than 5 reputable physicians, who examined him, without, however, stripping his chest. One and all failed to discover anything wrong with the apices of his lungs and told him to be of good cheer and go about his business. As a matter of fact, this man had signs which could not have escaped discovery had his chest been stripped, in what would correspond to the posterior and inner aspect of the left lower lobe, signs of advanced disease such as might be elicited over a large cavity or an area of bronchiectasis. Another point of interest to me, brought out by Dr. Norris, is the fact that sometimes in its onset tuberculosis of the lungs is accompanied by general arthritic pains, simulating at times rheumatism. Such a case occurred recently in my service at the Phipps Institute. It was that of an Englishman who had been in this country about 6 months, during which time he had lived in the same boarding-house with a man who had advanced phthisis. About 3 months ago he began to suffer with vague pains in his joints, cough, night sweats and some loss of flesh. He consulted a physician, who told him he was suffering with rheumatism, and he was under this physician's care for some time, being treated with the salicylates. When I saw him the arthritic pains were still a marked feature of the case, but he presented all the signs of recent tuberculosis, of an acute and very active process. In addition to the various modes of onset of tuberculosis as classified by Dr Osler in his text-book, I think it should not be forgotten that in the early stages it may simulate rheumatism very closely.

DR. R. N. WILLSON: About a month ago I reported 15 cases of incipient phthisis that proved to be undoubtedly tuberculous, and which I saw very early in the disease. The diagnosis was in each instance confirmed, sometimes by the discovery of tubercle bacilli or sometimes by other indubitable signs, and always in consultation with other men. One of the early signs noted, and not mentioned to-night, is fistula or ulcer or fissure of the rectum. One or other of these conditions has occurred in so many incipient cases that have come to my notice that it seems to me most important not only when there is a fistula present to note the fact and to presume that it is tuberculous, but to examine the rectum in every case of suspected tuberculosis. The presence of the bacilli in a tuberculous lesion around the rectum can be demonstrated much more easily even than in the sputum. Another valuable symptom is the occurrence of a constantly subnormal temperature in early phthisis. I believe that in most instances, if the case be watched in the first few weeks and months of the disease, the temperature will be found to be subnormal, and with no fever even in the afternoon or evening. In 11 of my 15 cases, with the thermometer retained in the mouth for 5 to 10 minutes, and the patient often taking the temperature himself (with the idea that if this could be raised by nervous excitement it would be under these conditions) the temperature remained constantly subnormal throughout the day. In the other 4 there was an occasional rise between 4 and 6 o'clock. A run-down condition with subnormal temperature and clammy, often blue, hands, are the first symptoms that may be expected in a case of tuberculosis. Following this often comes the cough; in several of my cases, however, there was neither cough nor sputum. In very few there were night sweats. At the time of reporting the 15 incipient cases, I also reported 71 cases of advanced phthisis. A study of the symptomatology shows that even in this series there was at times neither cough nor sputum; then a relighting of the disease with the typical and clinical symptoms. I recently saw a case of incipient phthisis in a patient who had had an attack of typhoid fever with a normal course until about a week before the fall of temperature, when a rectal abscess developed. A fistula still remains which I think is undoubtedly tuberculous, and which was probably present prior to the attack of typhoid fever.

DR. L. F. FLICK: This is probably the most important subject before the medical profession. I am convinced that if every practitioner would take the trouble to try to diagnose incipient tuberculosis, the tuberculosis problem would be solved at once. The more I see of tuberculosis the more convinced I am that all cases have a long stage of incipiency before they show such symptoms as will arrest attention. Until this fact is recognized the early cases will not be discovered. Of the cases sent to White Haven about 15% are incipient cases. In my own experience I rarely see a really incipient case. The incipiency of tuberculosis is so mild that it is difficult to recognize it because it does not produce symptoms which arrest the attention of the physician. Incipent cases should be looked for in the families in which there are advanced cases. It is surprising how many may be found in such places. A common mistake is overlooking a small healed or partially healed cavity in the apex of one or the other lung which gives almost normal resonance. I frequently see a case diagnosed as an incipient case because infiltration has been found on one side, while close examination will show all the symptoms of a cavity on the other side. Nearly all cases of tuberculosis can be traced to an implantation in the house, sometimes 10 to 20 years back. I have seen persons apparently in perfect health, with advanced lesions and tubercle bacilli in the sputum. Do not take it for granted, because it is said to you that none of the family have tuberculosis, that it is true. Do not fail to examine the expectoration of any one who expectorates. It is not necessary for people to cough in order to spit up matter. I have had patients declare that they had no cough who nevertheless spat in the mornings and whose sputum contained tubercle bacilli. The man who does not examine the sputum of every patient who expectorates is bound to make mistakes.

DR. NORRIS: There is no doubt but that fistula in ano is common in tuberculosis and that such fistulas have a tuberculous origin. While my personal experience has been limited, I have never yet seen a fistula in an incipient case. Almost all cases in which I have encountered this lesion have been distinctly advanced ones.

Special Lectures for the County Medical Society.

BY J. MADISON TAYLOR, M. D.

[Read May 25.]

The American Medical Association has matured a thoughtful plan for improvement of the organization and individual efficiency in the profession. This contemplates two avenues of approach to the problem presented; one from the County Medical upward to the general body, and the other from the general body downward to the County Society.

All members of this society should be, as they have a right to become, members of the American Medical Association, therefore I will assume that all who listen to what is now presented have exercised their rights, and that they have read the various articles on the subject of organization of the profession under the auspices of the American Medical Association published in its *Journal* for the past two years. With the assumption that those who hear these remarks are familiar with the aims and methods of the Association, it will be only necessary to say that the upward side of its work is the system of unification of the State Societies by the election of delegates from the County Societies, and the formation of the House of Delegates of the American Medical Association by delegates from the State Societies and from the sections of the Association.

The downward, or assistance, side of the work of the Association is in the hands of the committee on organization of the American Medical Association, under the chairmanship of Dr. J. N. McCormack, of Bowling Green, Ky.

It consists of establishing county societies where none exist, and encouraging and strengthening those societies needing help and unable to find it within their own ranks.

It is evident that strong city societies, like the Philadelphia County Society, have within themselves the machinery for accomplishing the local work, which the committee on organization must do for weaker societies.

This paper presents a plan for increasing the efficiency of this society to its members and, by reason of this increased efficiency, of contributing to the general potential of the national Association.

It is for you to criticise the plan, condemn it if undesirable or impracticable, or to aid it by your suggestions for betterment if you find it worthy of acceptance.

No one more than the writer is aware of the shortcomings and crudity of the suggestions now to be offered, and no one more than he appreciates the value of the thoughts and plans of others for the attainment of the end proposed.

We have a present membership of a thousand men, with a prospective increase to fifteen hundred in the course of the next two or three years. This is the leading medical teaching center of our country, abounding in men in daily practice communicating to students and graduates the most recent advances in all lines of medical work.

It is permissible to express the doubt whether one-half of the thousand members of this society gather much assimilable knowledge from the ordinary journal article or paper read before the society, presenting as they aim to do some new thought, or aspect of an old thought in an original or striking fashion. They are not designed primarily to instruct.

They may be and often are replete with admirable facts, formulations and conclusions. Nevertheless for purposes of instruction they lack much of simplicity, directness and clarity of presentation. This, too, in direct ratio as they fulfill their avowed requirements of originality or novelty needed for publication.

Now and again a symposium is held covering a subject of admitted practical importance, the various parts being assigned to members competent to speak authoritatively, and a finished product results. These are much appreciated. Nevertheless none of these fulfill the requirements for systematic instruction of the general practitioner or specialist, who are liable to drift apart in the application of their researches. The specialist undoubtedly requires frequently to be supplied with a review of the fundamentals of medical procedures which warrant restating lest he become narrow. The general practitioner assuredly needs to be presented with the significance and practical bearings of the advances made by the specialist to enable him to appreciate the importance of specialism for daily work.

The graduate of ten years' standing in small communities frequently comes to town for postgraduate instruction in the special departments of medicine and derives profit from this expenditure of time and money. The graduate of ten years' standing who lives in the large cities will, as a rule, admit that he greatly needs a systematic review of the advances of medical thought in other lines than those of his chosen branch. He has a specialist always within easy call; hence, whether he specializes or not, he almost inevitably permits a certain quality of neglect to narrow his mental horizon, however learned he may be in the department of his choice. The busy general practitioner of ten years' graduation has little time to familiarize himself with what has been done in special fields since he graduated, and he is apt to skip the specialized articles in the journal, which he sometimes reads. He would like to know of the advances made in these fields, but he finds that the journal article presupposes knowledge on his part which he does not possess, and has not the time to acquire. Equally also is the specialist in peril of becoming woefully ignorant of advances in general medicine because he has all he can do to keep up with the mass of papers appearing in his specialty, and so he is in danger of becoming narrow and contributing to the strengthening of the idea which the general practitioner acquires that the specialist pays too little attention to the patient, and too much to the particular trouble for which he comes to him. Consequently the specialist and the general practitioner drift apart to their mutual detriment and to the strengthening of the rapidly growing conviction of the public that the general practitioner knows little of the specialties and needs to know less, and that the specialist knows but little of the body in general, and the less he knows of it the better specialist he is. From this conviction of the public grows the crop of Christian and unchristian scientists, of Faith Curists, of osteopaths, of graduates of schools of optometry, all of which brands of charlatans and many more we have with us and will continue to have in increasing quantity unless we adopt means to better acquaint ourselves with the daily advances made in medicine.

To acquire well-rounded wisdom, from whence alone comes mature judgment, we all would be better conservators of health if we could periodically have presented facts and truths intimately correlated to our own work.

How can this obvious desideratum be attained? There are the possibilities of seeking clinical positions with hospital men for a while, but this is open to many objections. There are the postgraduate schools, but the hours may be difficult to meet, will in all probability conflict with important engagements or fixed duties.

My recommendation is that this society establish a course of postgraduate lectures for its own members. There can be no question but that if perfected by experience it could be made to offer much of value, and when once established would be widely welcomed.

The lectures could be given in the evenings, a time when most men can spare an hour or two. Indeed, two or even three lectures, of from half to three-quarters of an hour each, could be given in one evening. Thus allied subjects could be advantageously correlated.

This society has among its members those preeminently fitted to give such lectures. They should present elementary, concise and practical facts. Above all we need broad philosophic generalizations and concepts of permissible relationships. Or if the subjects selected involve new views, such as was given so admirably on the subject of immunity by Dr. Joseph McFarland recently, it should be simplicity itself.

A demonstration with blackboard drawings is far more comprehensible than a set paper; better fitted to carry conviction and to systematize impressions. Lantern slides can often show more than the best of rhetoric. Again, greater freedom of speech is permitted where publication is not contemplated. Publication in the transactions is not a part of the idea.

It might be necessary for the society to provide itself with a suitable apparatus for illustrating some of the lectures, but such a plant is an essential for the society in other work of the regular meetings.

Special evenings should be given to these lectures; for example, the third Wednesday of each month, excepting the dates of the quarterly meetings in October, January, April and June, being available and presumptively suitable.

If the course of lectures started in November and ended with May, this would give one evening each in the months of November, December, February, March and May, a total of five lectures, sufficient to test the idea. Should it be desirable to increase the number of lectures, either at the commencement of the plan or later on, after it is tried for a year, the choice of Friday evenings would seem one which would not conflict with the meeting nights of other societies to which members of this society belong, and this would add, in the months named, for one Friday in each month, an addition of five lectures. Care should of course be taken that evenings chosen for lectures do not conflict with meetings of the branches of this society or with other medical society meetings.

All expenses of the meetings and the cost of the lantern and other paraphernalia necessary to the delivering of the lectures should be supplied by the funds of the society. If the lecturer desires a stenographic report with reduction to typewriting, this should also be borne by the society. It must be remembered that this is a part of the broad plan for general medical efficiency. Statement of the times and subjects of the lectures can appear in the regular notices of the society without material expense.

The presence of the Secretary of the society should not be required at these lectures, but a chairman should be selected at each meeting, although discussion should not be permitted nor should publication in the daily papers be allowed. In addition to the lectures before the society's central body the delivery of lectures before the branches, if requested by them, should be provided for; and publication of the same appear in the regular society notices.

If these ideas meet with the society's approval and should action favorable to the plan be taken, the writer believes that the subjects worthy of presentation are so varied, and a wise choice so essential, that he deems the matter should be delegated to a special committee, whereof one of the directors should be a member, to report promptly to the society, so that the plan may be put in operation next October, to continue until a year's trial shall prove whether or not the idea is a good one.

Resolution Recommended by Directors.—THE THIRD WEDNESDAY EVENINGS IN NOVEMBER AND DECEMBER OF THE PRESENT YEAR SHALL BE SET APART FOR LECTURES ON SUBJECTS OF PRACTICAL INTEREST, UNDER THE AUSPICES OF THE SOCIETY, TO WHICH ITS MEMBERS SHALL BE INVITED.

Alveolar Pyorrhea: Its Cause, Sequelæ and Cure.

BY D. D. SMITH, D.D.S M.D.

[Read April 27.]

In a beguiling pamphlet recently sent out to the dental profession by a manufacturing concern, may be found a labored attempt to present alveolar pyorrhea as a constitutional disease due to a socalled uric acid diathesis. This pamphlet, although signed by an M. D., is evidently from the pen of one wholly without experience. Having a meteoric surface-glow, the article is well framed to mystify and mislead respecting the true origin and not less the treatment of the disorder. Names, facts and inferences are speciously garbled and perverted, unmistakably in the interests of a commercial preparation recommended as a constitutional remedy.

We shall do well to remember that in constitutional disturbances pyorrhea is to be reckoned with as a *cause* of disease, but never as a *result*. The etiology of pyorrhea can no longer be dismissed by the theorist with the affirmation that "it is a disorder of constitutional origin"; for its manifestation near to or past middle-life only; its universal location about the roots of natural teeth; its special association with teeth of dense structure having large bell-shaped crowns practically exempt from decay; the complete immunity of all edentulous mouths, and more than all, the absolute cure without regard to constitutional conditions which attends the removal of the cause or the extraction of the teeth, all point with unerring precision to it as a trouble having positive and distinct local origin.

The *local* cause universally assigned for alveolar pyorrhea is deposits of calculi upon the teeth. Those pretending to find a socalled constitutional cause ascribe it to the "gouty diathesis" or to some "constitutional *vice*." These assigned causes are wholly inadequate to account for the manifestations of this depraved condition.

Accurate observations reveal the fact that deposits of calcareous matter (tartar) upon the teeth, while causing absorption of their supporting structures, seldom or never give rise to a condition of true pyorrhea. The teeth more frequently found enveloped in masses of salivary calculi are the lower incisors and cuspids and the superior first molars. Whilst these teeth may be loosened even to the point of exfoliation through absorption of the alveolus, due to increasing deposits of tartar, this condition is not alveolar pyorrhea. The development of pyorrhea in the mouth is wholly the result of local infection; an infection arising from the breath, from vitiated mouth secretions and excretions and from chemical decomposition and decay of waste substances in the high temperature of the mouth. Toxins from these and other sources are constantly present and, becoming cemented to the teeth chiefly by the mucous secretion, form the socalled bacterial placques, which are retained day after day, often year after year, becoming stagnant, offensive and most virulent infection. Pyorrhea is common to both sexes, but rarely if ever found to originate in connection with devitalized teeth. It seldom manifests itself before middle life, and then much more commonly in mouths in which practically full and crowded dentures are found.

Heredity has no influence whatever in the development of the disorder. That it has a marked influence in determining the shape and general characteristics of the teeth is well known and readily conceded; but while certain shapes and characteristics of the teeth are favoring conditions in the development of pyorrhea, they are in no sense a cause of the trouble.

Temperament as a factor in pyorrhea is very imperfectly understood. As an example of wholly erroneous views respecting it, a professor speaking recently upon this point declared that the disease prevails more generally in the sanguineous temperament. The actual condition is exactly the reverse of this. It is extremely doubtful if a mouth with the typical marks of the true sanguine temperament,—teeth of yellowish hue, small rather than large, perfect in mould, shape and structure, short and having little cervical constriction, regular in development, never unduly crowded, occlusion perfect,—was ever the subject of pyorrhea. I have never seen one. *Per contra,* the nervous, bilious and lymphatic temperaments, with all their compounds and admixtures, present formations and conditions of teeth and jaws which favor the retention of infection and the consequent development of pyorrhea. No classification of temperaments can possibly make the subject plain.

There are certain local conditions that promote the development of pyorrhea, and these demand most careful study. They are: first, the *presence of natural teeth in the mouth* (pyorrhea is impossible without natural teeth); second, the shape, character, number and placement of the teeth themselves; and third, the condition of the crown surfaces and the character and properties of the fluid environment of the teeth when the mouth is in repose. That the *presence* of natural teeth is necessary for the development of pyorrhea is manifest in the fact that it never appears in an edentulous mouth, even though the supposedly favoring constitutional factors, uric acid and gout, may be present.

The general character of the teeth, whether they are dense in structure with only a thin layer of cementum enveloping the roots—a condition necessitating limited and difficult circulation in this tissue—or whether they are softer in structure and possessed, as is usual in such cases, of a thicker cemental layer, thus permitting freer circulation in the cementum, with increased vital energy to oppose external encroachments, present important local conditions *favoring* pyorrhea in the one case and *opposing* it in the other.

The anatomical formation of the teeth also, whether having large and irregular crowns with strongly marked necks, and crowded into small, misshapen arches, or whether the reverse of these conditions prevail, viz.:—teeth small or medium in size, crowns merging into roots without marked cervical constriction, and regularly set in well-developed arches,—these conditions form marked predisposing or prophylactic features in the development of this disorder.

The third and most important factor among the local conditions for the induction of pyorrhea is the infection inevitably present on all exposed crown surfaces of the teeth, especially the proximal surfaces. Even when considerable care is taken of them, viscid toxic matter quickly accumulates upon untreated teeth, which is retained day after day, becoming stagnant and fetid, especially in the more inaccessible places, as between them and along the gum margins. These stagnant accumulations act to obstruct circulation in the gums, cementum and alveolus, and induce inflammation in all surrounding tissue. This infection on teeth is greatly intensified in virulence and activity by the high normal temperature of the mouth, as well as by toxic emanations from decaying tooth substance and decomposing food particles. These (and if there be any special local irritants, they are included) are the more active auxiliaries in originating pyorrheatic conditions, the subjects of which are legion.

The inflammation of pyorrhea begins in the tissues at some portion of the cervix of the tooth, more commonly on the lingual or palatine aspect or at some inaccessible point between the teeth, frequently between the larger molars.

Not all teeth in any one mouth are ever the subject of pyorrhea at any one time. Strong, healthy teeth with living pulps are the special subjects of pyorrheatic attacks. Teeth which have been devitalized in comparatively young life, if the roots have been properly treated, are virtually, if not absolutely, immune. This is due to the fact that cemental structure is not solidified or changed in character or quantity after devitalization of the pulp and dentin, save as it may be increased in thickness by external deposit.

I have never witnessed, in any case, the loosening and destruction of an entire set of teeth due to pyorrhea. With the displacement and loss of a single pyorrheatic tooth (much more a considerable number of such teeth) there is marked decrease in virulence of the infection as well as lessening of the inflammatory exudates. Movement of the tooth is always outward away from the point of the inflammation, as in effort to expel the irritant from the mouth. A tooth is never forced toward the centre of the mouth, but always away from it, by the pyorrheatic inflammation. Rapid elongation, protrusion or rotation of a tooth—movements at times attended with great force and considerable pain—indicate that the pericementum and cementum are specially involved.

To characterize the destruction of tissue in pyorrhea as "molecular necrosis" may be well enough if it is understood that the inflammation arrests, partially or entirely, the nutrition of the parts. This is especially the case in the alveolus. It is the arrest of the nutritional process which is the real cause of the excretion of the tissues at the surface. There is no zone of dead tissue exfoliated as in true necrosis. It is rather a surface necrosis. That nutrition is partially if not entirely suspended in some cases is plainly evident from the stagnant circulation, the tumefaction and purple color of the gums. The progress of the disease can only be arrested by the reinduction of normal nutrition. All remedial efforts should therefore be directed to the accomplishment of this end.

Alveolar pyorrhea with its necessary history of antecedent, long-continued septic mouth conditions, is not a result, but the unimpeachable *cause* of many serious systemic diseases, the etiology of which is not only unknown, but wholly unsuspected. Its diverse local manifestations, as the displacement of the teeth, the turning of them in their sockets, the formation of pus pockets beside the roots, the loosening of the teeth and their final exfoliation, are but minor sequelæ in comparison with the constitutional manifestations seen in the slow chronic pyemic effects.

If the effects of pyorrhea were confined to its ravages in the tissues of the mouth—the wasting of the alveolus and the exfoliation of teeth—it would be inconsiderable in importance; but the pernicious emanations from twenty or more square inches of filthy infected tooth surface, carried in inhalation directly into the circulation through the lungs, and this augmented by the perpetual ingestion of masses of mucoid toxins—pus and other pyogenic products of the disorder—develop constitutional conditions of most serious import.

The gravity of states and conditions resulting from pyorrhea in the mouth has not yet been comprehended. If better understood, it would no longer be treated with comparative indifference as at present; on the contrary, it would awaken a feeling akin to alarm. As yet no comprehensive measures have been suggested by either medicine or dentistry to allay its symptoms or avert its consequences, and both professions stand in its presence today pitifully helpless.

The inflammation of alveolar pyorrhea differs from inflammations and disease-conditions in other parts, in that the septic products are of necessity discharged directly into the mouth, whence they inevitably pass into the digestive tract.

Clinical observation shows the confluence of alveolar pyorrhea with rheumatism or gout, to be infrequent, and if associated at all it is as cause and effect—pyorrhea the cause and rheumatism or gout the effect; a condition exactly the reverse of the "gouty diathesis" theory.

The conjunction of pyorrhea and renal complications is far more common and serious. Uremia is a usual result of pyorrhea, due in greater part to the perpetual ingestion of pus and other effete inflammatory products, which are constantly being disengaged in the mouth, where they are mixed with foods and drinks, and thus inevitably washed into the stomach. And here again the relation is cause and effect—pyorrhea the cause, renal complications, more commonly diabetes, the result. This has been repeatedly and indisputedly proven through cure of the pyorrhea curing the diabetic condition.

This infection appeals for recognition first of all in septic states of the breath. Poisonous deposits upon the teeth due to toxicity of the breath, are a constant menace, and principal factors in primal incitement of the disorder. Although in the aggregate such deposits may be meagre in quantity, they are exceedingly virulent and violently irritative to surrounding tissues; they are rapidly augmented by alluvium from vitiated salivary and mucous secretions, and from septic excretions, and not less by deleterious products from the necrotic condition of the alveolus and the perpetually irritated and inflamed gum margins at the necks of the teeth.

(Examples of breath infection appear in the surface discoloration of gold plates, gold and amalgam fillings, as well as in accumulations on the teeth.)

It is matter for earnest felicitation that offensive breaths, a result generally of neglected mouths, filthy conditions of the teeth, and repulsive mucoid oral fluids, are wholly preventable and surely curable when they exist.

The cause of pyorrhea being a local irritant, whether that irritant be the presence of the tooth itself or an accumulated infection on the tooth, the beginning of treatment should always be directed to the removal of the cause. Not all teeth that have been loosened through pyorrheatic infection can be redeemed and made firm, comfortable and useful, for when the disease has progressed to necrosis which involves the alveolus and pericementum, the entire circumference of the tooth, the osseous structures about the root or roots having become much absorbed—alveolar tissue once absorbed is never reproduced—immediate extraction is the proper treatment; or, if through development of a pericemental abscess, as not infrequently occurs in long-standing cases of pyorrhea, especially in connection with the molars, upper or lower, removal of the tooth is the one and only remedy.

Just here sharp distinction should be drawn between the ordinary apical alveolar abscess and the more occult and uncommon pericemental abscess. They are entirely unlike in character, in development, in prognosis and in mode of treatment. The former has been known and treated for years; the latter is of recent discovery, and is comparatively unknown. It was first differentiated by the author in 1897, and a full description of it embodied in an article which was published in the August number of the *Dental Cosmos* of that year, under the title "Pericemental Abscess." The closing paragraph of the article is as follows: "The prognosis of pericemental abscess is always unfavorable; have never been able to afford permanent nor positive relief. The only remedy—extraction of the tooth."

It should be the unvarying rule in the treatment of pyorrhea to speedily rid the mouth of all teeth which cannot be made permanently comfortable and useful. Teeth, especially molars, suffering from much alveolar absorption, if they are without natural occlusive antagonism, or any that can be rotated in their sockets, even though such movement be but slight, can never be made to retighten; their retention is a source of perpetual discomfort, a hindrance to mastication, and a positive menace to the health of the mouth. In view, therefore, of the utter inutility of such teeth, any attempt to retain them is a matter of sentiment alone; every other consideration demands their immediate removal.

Having extracted such teeth as cannot be made serviceable and comfortable, effort should be directed to the removal of all infction of whatever kind from all the remaining teeth. This infection may consist of masses of calcic concretions, coatings of stagnant inspissations, accumulations of septic matter on the exposed surfaces of crowns and roots, between the teeth, in pyorrheatic pockets, or in the many concealed nooks, crannies and irregularities found in connection with the teeth.

Dentistry affecting to see pyorrhea originate in some occult and unknown constitutional cause, has wholly failed to perceive or recognize the power of septic irritants found upon the surfaces of all untreated teeth. As there is no agency more surely destructive of the teeth themselves, nor one more provocative of general systemic disturbance, than the surface infection on them, so there is no more important operation, neither a more difficult process pertaining to the teeth, than the complete and successful removal of the pyorrheatic infection. Even when attempted at all, it is an operation performed with such laxity and indifference as to render it of little value.

Successful treatment for pyorrhea lies in the fidelity with which the toxic irritative matter is removed from the surfaces of the teeth, and rational after-treatment maintained. Constitutional remedies are wholly without avail except as cathartics, diuretics or sudorifics they may facilitate the expulsion of poisons already absorbed. Scraping of alveolar margins, removal of vital bone, massaging of the gums, and various other impractical modes of treatment have been suggested, but none of them indicate any true appreciation of the pathologic conditions involved. If necrosed bone is present, which is seldom the case, it is to be removed; beyond this, the less disturbance to the tissues involved in removal of the infection, the better the results.

All treatment should be such as surgery would institute for any wounded, abraded or excised surface in other parts, the difference being the difference in the character of the tissues with which we are dealing and in their environmental surroundings.

There is no organ or tissue in the system to which a tooth, with its anatomic and physiologic complexities, can be logically compared. If relieved of infection and restored to healthful condition, being fixed in the oral cavity, the teeth are at once replunged into an adverse environment and resubjected to adverse influences.

What, then, can be done by medical interference? Practically nothing. It cannot be made too emphatic that treatment consists in frequent and forcible change of environment,—a change more mechanical than medicinal in all that pertains to the teeth and to all mouth conditions. Every effort should be directed to reestablish healthful nutrition, which has been interrupted, if not wholly arrested, in the surrounding alveolus, pericementum and gum. No irritative toxins from the breath, from mouth fluids, offensive food particles or from other sources should be allowed on the crowns, at the necks of the teeth or in any pyorrhea pockets. Every concealed recess and nook should be reached and carefully cleansed of all accumulations with suitable instruments; and this, followed by the polishing of all exposed surfaces, including pockets, recesses and depressions, between the teeth, at the gum margins, or wherever infection may be found upon the teeth. This can be effected by hand methods only. All wheels, brushes or other revolving instruments driven by power, should be wholly discarded. Specially shaped wood points—orange-wood is to be preferred—secured in suitable holders—porte polishers—should be used for this purpose. With these all parts of the mouth and all surfaces of the teeth can be reached and operated upon. The best polishing material is a fine pumice-stone. The dry powder can be taken up and carried to place on the wood points, previously shaped and freshly dipped in water for this purpose. Free application of the pumice-stone, and vigorous use of the wood points, are the most efficient agents known for removing infection from the teeth, and not less for placing them in the most favorable condition to avoid further deposits. This treatment should be repeated every forty-eight to seventy-two hours at the beginning, and regularly continued until there are evident indications of abatement of the inflammatory condition and the closing of the pus pockets, when the intervals of treatment may be gradually lengthened until the limit of about one month is reached.

Every mouth with pyorrheatic tendency should be rigidly subjected to this mechanical treatment at the hands of an expert operator, for relief from the inevitable recurrence of infectious accumulations on and about the natural teeth. This treatment should be supplemented by *local* medication only. Internal remedies are not indicated, except as tonics or in special cases. Perhaps there is no better antiphlogistic or germicide for external use—and the mouth is an external cavity—than that rather disagreeable preparation known as phenol-sodique. It can be used *ad libitum* in the mouth and with great benefit, after each treatment. I have found it most efficacious applied to the gums on lint or bibulous paper.

After the second or third treatment the gums about the pyorrhea pockets and at the points between the teeth where there is greatest eversion of the festoons, should be touched regularly with deliquesced zinc chlorid. The handling of this preparation should be upon wood points. A small stick with point shaped to reach the parts may be dipped in the solution and applied as desired. It acts as a stimulant to the nutritional process. Tincture of iodin applied to the gums over a pyorrheatic cavity or tooth is a valuable adjunct in the stimulation of healthful nutrition.

Results from the treatment as outlined have proven a source of astonishment, and not less of gratification, to many who have interestedly witnessed them. Long-standing cases of pyorrhea, regarded as incurable and practically abandoned by the "constitutional cause" theorists, have readily yielded to this treatment and been cured in from six to twelve months.

Serumal deposits in pyorrheatic pockets are often difficult of diagnosis, and more difficult to remove. These deposits differ greatly in character and manner of formation from the salivary incrustations found upon the necks of teeth at the gum margins. They consist, for the most part, of smooth, hard masses of calcic matter, deposited from the stagnant fluids in the pyorrheatic pockets, cemented to the root in some irregular formation or inaccessible position, on lower teeth especially. They are not the occasion of marked inflammatory action, although the infectious matter is commonly deep-seated. They create pockets beside the roots, in which deposits accumulate, until the alveolus separates from the root throughout its whole extent. In many instances, the presence of these deposits can only be determined by the thickened condition of the overlying gum tissue—a characteristic of this infection—by the continued pus discharge under pressure, and by the persistent movement of the tooth, often attended with great force, in a direction opposite the accumulation. Serumal deposits destroy the life of the cementum and pericementum, and when these tissues have once separated, even though the deposits may have been perfectly removed, the vital union is never reestablished. For this reason extraction of the tooth is frequently the only remedy.

The Final Results of the Apostoli Treatment in Some Cases of Fibroid Tumor of the Uterus.

BY G. BETTON MASSEY, M. D.

[Read April 13.]

It is now somewhat more than sixteen years since I began the electric treatment of fibroid tumors of the uterus after the manner of the late Georges Apostoli, of Paris, and having occasion recently to revise the subject for a work now in preparation, I have been strongly impressed with the desirability of giving to the profession a brief review of the practical results that have attended this work in this long series of years. The value of the Apostoli method was hotly contested in medical literature some years ago. The time has now come when a dispassionate conclusion as to its real value is in order.

It may be recalled also by some of you that this Society appointed a commission to investigate this question during this controversy. I think the date of this commission's appointment was in 1889 or 1890. I am not aware that a report was ever made by it, and suggest that it is by no means too late for the work to be undertaken, and a report prepared that would be of great service to science. The lapse of fourteen or fifteen years between the appointment and report of this commission would, indeed, be an advantage rather than a disadvantage, for the question at issue takes a considerable time for its determination when we remember that the treatment itself requires from six months to three years in a given case, and that an important part of the investigation relates to the practical results as shown in the well-being of the patient in after years.

Should the commission decide to investigate the subject it will find the majority of these patients living, and their present condition can be easily compared with the records of their original status as noted by competent physicians.

During the sixteen years mentioned I have had under more or less thorough treatment one hundred and ten cases of fibroids, which have been carefully tabulated in the exact order in which they were first seen. I have made efforts recently to ascertain the present condition of as many of these patients as could be found by letters, circulars and personal inquiries, with the following results: Cases in which the results are unknown, nine. Cases resulting in anatomic and symptomatic cure, twenty-two (including eighteen that disappeared by absorption, three extruded through cervix in whole or part and one destroyed piecemeal by electrolysis). Cases resulting in symptomatic cure only, fifty-three (including twelve with great reduction in size, twenty-eight with slight reduction in size and fifteen permanently relieved of symptoms without change in size). Total cases resulting in practical success, seventy-five. Cases resulting in partial or complete failure, twenty-six.

Excluding the nine cases in which results are unknown, largely transient patients at a public clinic long since discontinued, it will be seen that the figures given show seventy-five actual or practical cures and twenty-six failures in 101 cases. In other words, three-quarters of the cases were successful and one-quarter failures.

The word "failure" should be further defined in connection with this work. With the exception of the result in one case, it means that the patient is left in a condition exactly the same as before treatment, and in a position to accept operative removal if necessary or desirable. The exception was an instance of death from septicemia in the year 1888, due to the failure to recognize the existence of a cystic condition, an error of diagnosis which was shared with one of the most eminent living gynecologists. How many of the remaining twenty-five failures were subsequently operated on is uncertain except in the cases of seven patients, in three of whom the operation was undertaken at my suggestion.

Turning from the failures to the successes, it will be noted that the result was satisfactory in three-quarters of the cases treated with known results. This is an important fact. The majority of these patients were contemplating operative removal when they sought advice, with all that it implied in danger to life and certainty of unsexing results. These women are to-day happy wives—some even disconsolate widows, for I have been surprised to note from the replies of patients who were treated ten and fifteen years ago the large proportion who have outlived the husbands that brought them to me.

The proportion of total disappearance of the tumor—eighteen out of 110 cases—is, I believe, larger than has been reported elsewhere. Some of these instances have not been personally verified by me and are merely reported as the patient's opinion, but in several instances I have verified the total disappearance of growths that were originally as large as an adult head, or even larger. As for the practical aspects of the patient's opinion of the disappearance in the cases not verified, I may say that, if the person most concerned cannot find the harmless remnants of the absorptive process, who need look for them?

No one, surely, will doubt the wisdom that inspired this method when questioning these cured patients, including both those in whom a harmless remnant may be found and those anatomically cured, for it will be hard to realize that these healthful individuals were once confronted with the dreadful verdict of leaders in our profession which prescribed a dangerous and unsexing operation as the only alternative to death or, at least, to permanent illness.

Turning to the question of the selection of cases for this method, these statistics teach that hemorrhagic cases are always cured of their dangerous symptoms, the hemorrhages ceasing, and the tumors usually decreasing satisfactorily. The interstitial type is also peculiarly susceptible to the treatment and frequently is entirely absorbed.

Those least adapted to it are the pedunculated subperitoneal type; the hard, monocentric, ball-like inclusions in the uterine wall; and those associated with purulent accumulations in the appendages. Whether these should be removed by hysterectomy depends on the amount of suffering or deformity produced by them. The list summarized in this paper includes one case of intrauterine cystic tumor that was cured absolutely by a modification of the Apostoli treatment, but it may be stated that cystic myomata, or any other form of degenerative fibromyoma, should be removed by hysterectomy when practicable. This was impossible of safe accomplishment in the case referred to in the opinion of the surgeons who sent her to me, and the somewhat hazardous treatment by intrauterine bipolar electrolytic destruction with strong currents finally resulted in complete disappearance of the growth and full restoration of health.

CONCLUSIONS: (1) A prolonged observation of cases of fibroid tumors of the uterus under the Apostoli treatment teaches that three-quarters of the cases subjected to the method will be practically cured, as attested by inquiries made from three to sixteen years after the cessation of the treatment. (2) The cases that responded poorly or not at all to this treatment are not harmed by it, when properly applied, and heroic measures may then be adopted with the certainty that milder means are of no avail. (3) Hemorrhagic and interstitial fibroids are best adapted to the Apostoli treatment; while subperitoneal or degenerated fibroids and those complicated with pyosalpinx are least adapted to be relieved by it. (4) So far as my inquiries and circulars show, there have been but seven deaths among these 110 patients during the sixteen years or less that they have been under my observation. It is an interesting fact, moreover, that but one of these deaths was due to the progress of the growth itself, proving the nonmortal character of this affection. Of the remaining six, one died long after treatment, of an affection totally unconnected with the growth, one of septicemia under electric treatment as related and four while being operated on with the knife.

Exhibition of Pathological Specimens.

1. FIBROSIS OF THE HEART. 2. ANEURYSM OF THE LEFT VENTRICLE.

BY WILLIAM S. WADSWORTH, M.D.

(Exhibited May 11.)

1. I have two hearts of unusual interest. The first illustrates a not uncommon type, but is the most remarkable example of the type that I have ever seen. The substitution of fibrous tissue for the normal muscle is remarkable. The left ventricle is dilated about a third. The vessels and valves show little atheroma. The distribution of the fibrous tissue points to a poisoning of the myocardium by substances contained in the blood, the portions next to the endocardium being almost completely reduced to a fibrous, whitish substance. While the wall is of a thickness that would be normal for a person of the size and development of the patient, the muscle is reduced by this substitution to less than half the normal amount. The evident cause of the condition was a long-standing gastroenteritis with intestinal autointoxication.

2. The second case is more striking, but less instructive. The aneurysm of the wall of the left ventricle is apple-shaped and about 2 inches in diameter The sac contains recent clot and opens into the ventricle by a hole about ½ inch across and into the pericardium by a recent rip on the upper and outer surface. The pericardium was ballooned with blood and clot to the size of a man's head. Fibrinous strings, especially about the base, indicate that bleeding has been gradual. The sac was firmly attached to the pericardium. A number of weird diagnoses had been made, but the real condition was not suspected.

PROCEEDINGS

OF THE

Philadelphia County Medical Society.

A Glance at the History of Cerebral Localization with Some Considerations Regarding the Subdivisions of the Areas of Representation of Cutaneous and Muscular Sensibility and of Concrete Concepts.*

BY CHARLES K. MILLS, M.D.

[Read May 25.]

The initiation of the modern era in cerebral localization should be attributed to two men of notably different characteristics, Francis Joseph Gall and Sir Charles Bell. Some might be inclined to dispute this assertion in so far as it relates to Gall, forgetting that he, in spite of his misconceptions and vagaries, first fixed the attention of the world upon the great idea of the plurality of mental functions or faculties and their localization in separate centers in the brain. Gall, born in a town in Baden in 1758, after studying medicine at Strassburg, settled in Vienna in 1781, and about 1796 or 1797, first announced his views with regard to the subdivision of the brain into organs. His chief work on the anatomy and physiology of the nervous system was published in parts between 1808 and 1820. His contributions to our present knowledge of exact localization were not large, although he indicated, with data drawn from clinicopathology as well as from his supposed correlation of the faculty of language to a portion of the skull, the position for the speech center, later fixed with more scientific precision by Broca. In another paper I shall refer more specifically to Gall's work on the localization of the function of speech.†

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*Abstract of the paper.

†The present paper is one of several recently prepared or in course of preparation by the writer, being designed to sketch the development of our knowledge of the subject of cerebral localization and to give its recent status, presenting at the same time the writer's views and his contributions to the subject. The first of these papers, read at the Conference in Neurology and Psychiatry, held

Sir Charles Bell, in 1811, made the great discovery of the subdivision of the spinal nerve roots into an anterior or motor and a posterior or sensory set. This was the first step in the experimental and clinicopathologic study of localization. All that is now known of the subject is the inevitable outcome of this discovery. To appreciate the enormous advances which have been made in our knowledge of cerebrospinal localization since the time of Bell, it is only necessary to compare Bell's well-known diagram of the subdivision of the spinal nerve roots, reprinted in so many of the works on anatomy and physiology during the last century, with some of the recent schemes showing the entering and emerging spinal paths and the subdivisions of a transection of the cord into its columns and areas, and their neuronal constituents.

Before the time of Gall and Bell, views regarding the localization of faculties in the brain were always hazy and sometimes extraordinary. The general tendency of the ancients, and of the writers and teachers up to a comparatively modern period, was to give to the spaces of the brain, to its chambers and corridors, first importance in the localization of its functions or controlling agencies. This was largely due to prevailing metaphysical and teleologic views. Hippocrates placed the seat of the mind in the left ventricle; Erasistratus believed that air, after undergoing elaboration in the lungs and heart, was converted in the ventricles of the brain into animal spirits which pervaded and controlled the body; and Servetus, in the sixteenth century, taught that the choroid plexus secreted the animal spirits, that the fourth ventricle was the seat of memory, and that the soul dwelt in the Sylvian aqueduct. When the philosophers began to assign the seat of mental or spiritual attributes to the solid portions of the brain, they still showed their transcendental tendencies, as when Descartes in the seventeenth century assigned the soul to the pineal gland. Bruno in the sixteenth century taught that the soul had its seat

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at the Sheppard and Enoch Pratt Hospital, Towson, Md., May 9, 1904, and in part before the Kings County Medical Society, Brooklyn, N. Y., April 19, 1904, was published in the *Univ. of Pa. Med. Bull.*, May, 1904. In this paper were given for the first time two schemes of the physiologic areas and centers of the human hemicerebrum which place the motor area cephalad of the central fissure and in other important particulars indicated new subdivisions of the cerebral cortex and new locations of centers. In a third paper read before the College of Physicians of Philadelphia, June 1, 1904, and published in the *Transactions of the College*, 1904, aphasia and the cerebral zone of speech are considered.

wherever there was a sensation. Up to a comparatively recent period, from which we have not entirely escaped, the brain has been regarded by many as a single organ, one which acts as a whole; also until a period which only briefly antedated the discoveries of Fritsch and Hitzig and of Ferrier, the microcosm theory of cerebral function, the doctrine that in each part of the brain resided the functions of the entire mass, largely prevailed.

Notwithstanding the generally prevailing views adverse to the idea of brain localizations, long before the time of Gall the view that the brain was the organ of many faculties or functions had been promulgated, although in a crude way. One of these views was that the cerebrum was the organ of perception or attention and the cerebellum that of memory. St. Gregory of Nice compared the brain to a city in which the going and coming of the inhabitants caused no confusion. A sketch of the head made by Albert the Great in the thirteenth century shows five circles placed over three portions of the head indicated as anterior pars cerebri, media pars and posterior pars. Various faculties or qualities are placed in these circles. In the centuries succeeding the thirteenth the subject was treated by a number of authors, and one of these published an engraving in which from a line about midway between the orbits and hairline, backwards, seven spaces are indicated by names supposed to designate the faculties beneath them. These names and their locations are, *sensus commun, fantasia, imagina, vermis, cogitative, estimativa* and *memorativa.*

Omitting a discussion of the centers of speech and the cerebral zone of language, except in so far as such consideration is necessary to our general subject, I shall now glance at the development of localization views since the discoveries of Fritsch and Hitzig and of Ferrier between 1870 and 1875. The status of the subject, at least as taught generally in Great Britain and in America, is well represented in the diagram of Ferrier showing the probable position of the centers of the human brain from homologies with the brain of the monkey on which his experiments were chiefly made. The reader is referred to my recent paper in the *Univ. Pa. Med. Bull.*, May, 1904, for a sketch of the progress of our knowledge of localization from about 1875 to the present time. This has been chiefly in the following directions: (1) in the more exact limitation, location and subdivision of the great motor area; (2) in an increase in the number of centers concerned with the function of speech and correlated processes; (3) in additions to our knowledge of the localization of areas of representation for cutaneous and muscular sensibility and stereognostic perception; (4) in a more exact and elaborate knowledge of visual and auditory localization; (5) in a more comprehensive grouping of brain centers into general areas, this being the outcome especially of the work of Flechsig; and (6) in additions to our knowledge of the subdivisions of the great concrete concept area or posterior association region of Flechsig. The two diagrammatic schemes of the writer represent fairly well what he regards as the present status of the entire subject.

It is probable that the areas of representation of cutaneous and muscular sensibility are subdivided in a manner analogous to the subdivision of the motor area, in other words, for the face, head, neck, upper extremity, trunk, lower extremity and other parts of the body, and that even some of these areas contain subareas and centers. As indicated diagrammatically, the cutaneomusculosensory area encircles on all sides the great motor area, on the lateral aspect of the hemispheres, occupying the postcentral convolution and the anterior extremities of the superior and inferior parietal gyri or lobules, and on the mesal aspect the more posterior and inferior portions of the paracentral and frontomarginal gyri, and the contiguous parts of the precuneus and gyrus fornicatus. The sensory areas for the face, head, neck, upper extremity, trunk, lower extremity, etc., occupy respectively areas adjoining the subdivisions of the motor cortex representing these parts of the body; in other words, that the areas and subareas of representation of the movements of the larynx, jaws and face should be toward the lowermost portion of the postcentral and postparietal convolutions, the areas for the head and neck, upper extremity, and trunk coming next in order from below upward, while on the lateral edge of the hemisphere and on its mesal aspect are centers for the lower extremity, anus, genitalia and viscera. Clinicopathologic, experimental and psychologic facts can be adduced in support of these localizations. Studies in hypnosis and in hysteria and of the sensory aura of Jacksonian epilepsy point in the same direction. A considerable number of cases of limited cortical or of subcortical lesion have been recorded, in which the anesthesia has been circumscribed to a limb or the face or trunk, or to special portions of these larger divisions of the body. The well-known experiments of Horsley and Schafer also showed that circumscribed areas of anesthesia sometimes resulted from experimental lesions of the limbic lobe. Grünbaum and Sherrington, in their experiments on the higher anthropoids, demonstrated that certain segments of the nonexcitable postcentral convolutions were distinctly related to particular subdivisions of the precentral motor cortex. Faradization of portions of the cortex of the postcentral convolution, while not calling out motor response, facilitated this response in portions of the precentral convolution at the same horizontal level. This is a fact pregnant with suggestion.

Numerous facts supporting the subdivisions of the cutaneomusculosensory area into a mosaic of centers will be presented in another contribution. It cannot be considered as fully established that the area of cutaneous representation is more cephalad than that of muscular representation on the lateral aspect of the hemicerebrum, and more superior on the mesal aspect as indicated in my diagrammatic scheme. Some facts would seem to bear out this suggestion, and others, especially the experiments on the gyrus fornicatus, the converse proposition, namely, that muscular sensibility is represented next to the motor cortex and cutaneous sensibility more caudad and more ventrad.

The centers contained in the zone of speech will be considered in a paper to be read before the College of Physicians, June 1, 1904, and the areas of representation of the muscular sense and of stereognostic perception have already been discussed by me somewhat fully in previous papers.* I shall in the rest of this paper confine myself to a brief consideration of several of the subareas or centers of the great concrete concept area or zone, namely, those for object seeing, for orientation and for intonation. I shall also briefly discuss the question of the cortical representation of color recognition.

Under such designations as mind blindness, soul blindness, object blindness and visual pragmatagnosia (Wyllie) is described a condition in which the individual, because of a cerebral lesion or disease, is unable to recognize by sight once familiar objects. Old visual memories of the kind required for recognition of particular objects are no longer recalled. I shall not enter into any discussion of the refinements of this interesting subject, as this is foreign to my present

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*The Separate Localization in the Cortex and Subcortex of the Cerebrum of the Representation of Movements and of Muscular and Cutaneous Sensibility, *Jour. Nervous and Mental Disease*, November, 1901.

A New Scheme of the Zones and Centers of the Human Cerebrum, *Jour. Amer. Med. Ass.*, October 4, 1902.

purpose. In a note to my recent article in the *University of Pennsylvania Medical Bulletin*, May, 1904, on the physiologic areas and centers of the cerebral cortex of man, I indicated my belief that the cerebral area for object seeing was a large one and probably subdivided, especially in highly civilized man, into several subareas or centers of representation such as those for geometric and architectonic forms and for persons, places and natural objects. Very few cases of object blindness with necropsy have been recorded.

In order that object blindness shall be complete, the recorded cases would seem to show that it is necessary for lesions to be present in somewhat corresponding locations in both hemicerebrums. Transient or recurring object blindness is sometimes exhibited by patients with a lesion confined to one hemisphere. Two cases of this kind have fallen under my observation. In both of these cases operation was performed for the removal of a brain lesion, presumed to be tumor, although in one case at least the result did not confirm this opinion. In this case the patient presented in the right half of the body disorders of sensation, stereognosis and coördination. He was partially word deaf, word blind and letter blind, and late in the case showed marked right hemiparesis. The operation was performed with the view of exposing the brain at the posterior extremity of the first temporal convolution. A large patch of necrotic tissue, having somewhat the shape of a pyramid with its base toward the occipital pole of the brain, was uncovered. The lesion may have extended farther than was revealed by the operation. It not improbably included the caudal extremities of the first and second temporal convolutions, and possibly more. The operation was performed four years prior to the writing of this paper, and the patient is still living and in fair health, but is hemiplegic, partially hemianesthetic and aphasic. He suffers at times from curious attacks which can properly be described as periods of mind blindness or object blindness.

Liepmann has recently reported the only practically uncomplicated case of soul blindness which has been so far reported, although the cases of Serieux and of Lissauer are of value notwithstanding the complication of object blindness with other symptoms like word blindness. The case of Liepmann was first recorded clinically in 1902. *The patient, a music teacher, aged 50 years, had an apoplectic attack September, 1901. After this he did everything in a

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**Allgm. Ztschr. f. Psychiat.*, Bd. 59, p. 952, 1902.

reverse or foolish manner, as for instance, he washed in his soup. He did not recognize large objects, nor his own reflection in the mirror, but recognized persons by the voice. He did not know his own wife by sight; color perception was much disturbed. A similar defect was present in the right upper quadrant of the visual field; vision was two-thirds. He could imitate large movements fairly well. Well-known objects were often wrongly named. Recognition through touch was slightly disturbed, but through hearing was normal. Motor aphasia was absent, as was also sensory aphasia, unless his wrongly naming objects might be so considered. This patient died in 1904, two years after the case was first recorded by Liepmann. A necropsy was obtained with most interesting results, showing the existence of lesions on both sides of the brain, on the left in the lower occipital convolutions and on the right in the angular and second occipital convolutions.* At the base of the left occipital lobe, says the record, was a deep cavity which indicated an area of softening involving the fusiform and lingual convolutions. In the right hemicerebrum the area of softening was on the convexity and extended from the angular gyrus through the gray and white matter of the second occipital convolution.

[After presenting two other cases of less uncomplicated mind blindness reported by Serieux and by Lissauer, the speaker discussed the subject of the cortical representation of color recognition, of intonation and of orientation. Cases of Brill, of Verrey and of others of loss or impairment of the achromatic sense referable to lesions circumscribed to the occipital lobe were given, and the centers of half retinal and of central retinal representation of colors and also of form and of luminosity were tentatively indicated. The representation of intonation was placed in the anterior extremity of the temporal lobe, with supporting cases, and that of orientation in the posterotemporal region anterior to the areas for object seeing. Attention was directed to the fact that the localization of centers in the concrete concept area will be determined by two classes of studies; (1) by the correlation of circumscribed pathologic findings with particular symptom-complexes, as for instance, with different forms of object blindness and object deafness, and (2) by the correlation of fissural and gyral characteristics in particular regions of the brain with mental acquirements of a high and special order on the one hand, or with the

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*Liepmann, A. J. *Allgm. Ztschr. f. Psychiat.*, Bd. 61, Heft 3, p. 424, 1904 absence or relative absence of such capacity on the other hand. Reference was made to the early work of the speaker on racial and on arrested and aberrant brains; to the studies of Professor Burt G. Wilder on brains of high type, and particularly to the investigations of Dr. Edward Anthony Spitzka, of the brains of educated and distinguished men. Diagrams were used to illustrate all points presented. After this presentation the following series of practical conclusions was drawn.]

In conclusion I would like to direct attention to the strictly practical applications of the large subject in hand, and especially in the direction of surgery. During the last five or six years brain surgery, guided by localization, has had a renaissance, and the percentage of successful results in operations for localized hemorrhages, abscesses, and especially tumors, is gradually but surely improving. This improvement is due (1) to a more thorough knowledge of cerebral localization; (2) to more exact methods of mapping out the site, size and direction of operations; and (3) to improvement in surgical technique. As regards surgery, I can only take time to direct attention to a few of the valuable results of recent studies in localization.

(1) In operating for prefrontal tumors higher psychical symptoms should be the chief guide, and, in the case of the left hemisphere, agraphia and aphasia, the opening in such cases always being anterior to the main extent of the motor region.

(2) In all operations for brain tumors with dominating motor symptoms, the opening of the skull should be made so that the correlative brain exposure will be three-fourths in front and one-fourth behind the central fissure, the base of the flap being perpendicular to the lower end of that fissure.

(3) In operations for tumors having symptom-complexes in which disorders of the muscular sense and astereognosis are dominant, the opening in the skull should be so made that the cerebral exposure will be three-fourths behind and one-fourth in front of the central fissure.

(4) When oculomotor symptoms such as abducens paresis, lid drooping and nystagmoid movements are present with symptoms pointing to the parietal lobe, the operation should be parietal or parietooccipital, it being recognized that the interference with eye movements is not basal, but probably due to disturbance of the visual motor cortex.

(5) When object blindness in any of its forms is the central

feature of the symptomatology, operation should be done with a view of exposing the lower temporooccipital convolutions.

(6) When relative or absolute hemianopsia or hemiachromatopsia or both are the most important symptoms, the operation should be with the view if possible of reaching the mesotentorial surfaces of the occipital lobe.

(7) When forms of literal or verbal blindness are the central features of the syndrome, the angular gyrus should be the focus of the exposure.

(8) Similarly, when verbal deafness is the deciding symptom the posterior extremities of the first and second temporal convolutions should be the objective points, while for uncomplicated verbal amnesia the midtemporal region should be exposed, and for note deafness or amnesia, the anterior temporal region.

DISCUSSION.

DR. F. X. DERCUM: When I was a student I know how vigorously Dr. Mills fought the battle for cerebral localization, and in those days physiologists were still holding the view that there was no localization of the brain, except one very general in character. Speaking of Dr. Brill's interesting case of color blindness, Dr. Mills said it was not necessary to go abroad to find interesting cases. I think we may say that it is not necessary to go abroad to find the highest exemplification of our knowledge of this subject. Dr. Mills' presentation of the subject is pregnant with interesting suggestions. In the first place, the names which he has given the anterior and posterior centers embody very important ideas. The posterior association center is essentially a center in which all sorts of sensations are correlated and combined. It is essentially an *esthetic* center. The anterior center must be *kinetic*, and it is in this respect that we have found in studies of the brains of men with whom we have been familiar, wonderfully confirmatory results. I do not mean to imply any lack of reverence when I speak of the brain of my personal friend, Dr. A. J. Parker, known to many here. The frontal lobes in his case were marvelously complex, and in his instance we all recall to what extent his mind was given to abstract scientific thought, to profound morphologic study; and how very great was the mathematical ability which he possessed. In regard to placing the motor area entirely in front of the fissure of Rolando, an exception may possibly be taken. It is at least in conflict with our clinical experience. In cases which have been trephined and in which we stimulated the cortex by means of electricity, we have had results in the ascending parietal convolution as well as in the ascending frontal. It has perhaps required a somewhat stronger current; this fact taken in connection with the use of a bipolar electrode may explain the difference of results. It may be that in future operations with the unipolar electrode of Sherrington we may get the same effects as those of Sherrington in the anthropoids. That the sensory areas are mapped out in detail as are the motor, I regard as highly probable. There are clinical facts which strongly suggest this. In cases of hysteria for instance, we see a segmental anesthesia. It is a loss of sensation which we recognize is psychic. It must therefore be a cortical loss; it does not follow the course of the nerve distribution nor of spinal segmentation. Its occurrence is a strong argument for the special representation of the limbs by segments in the cortex. That this segmental representation is adjacent to corresponding portions of the motor area is highly probable. With Dr. Mills I feel that studies in general morphology of the brain are of the highest importance. I believe that studies not only of average brains, *e. g.*, those of the patient whom we find in the hospitals, are of value, but especially the brains of men who have been distinguished for their intellectual or other achievements, and whose characteristics are well known; this is also true of the brains of criminals. Dr. Mills has presented to us not his final results, we hope, but the generalization of a vast amount of labor, and I am one of those who believe that the psychology of the future will have to be based largely upon his studies. It is the same with psychiatry; I believe we will learn much from the gross morphologic study of insane brains.

DR. W. G. SPILLER: I was a little surprised to hear Dr. Mills say that he hoped to have the opportunity to observe a case in which there was object blindness from a lesion of the parietooccipital region. I think he has had such a case. I saw a patient in his office within the past few days, whom I had seen some 2 or 3 years ago. That man has had at times temporary mind blindness. While the case was Dr. Mills', Dr. Mills was not able to be present at the operation and I represented him. Dr. Keen exposed the brain because of symptoms suggesting tumor, and found a distinct area of softening at the junction of the left temporal with the occipital lobe, and possibly involving the parietal lobe. I have had several cases recently that have thrown some light on localization. Sherrington, when he lectured at the University of Pennsylvania a few weeks ago, pointed out that in the higher apes the center for the face is a large one; and I was somewhat surprised to see how large a portion of the precentral convolution he had mapped out for this center. It is a question in my mind whether we have not located the center for the upper limb too low in the precentral convolution, even though in the ape the center for the face may extend higher than in man. I am almost convinced of this from a case in which the center for the upper limb was much higher in the cortex than we supposed. It was a case of tumor in which Dr. Frazier performed the operation, and the tumor was found in the upper part of the motor area and was entirely removed. I expected the man to be paralyzed in the lower limb, but on the contrary, he had much power in the lower limb and had complete paralysis of the upper limb of the opposite side. Sherrington has located the center for the trunk in the precentral convolution, between the center for the lower limb and that for the upper limb, and this is where we should expect to find it. In a case in which Dr. Frazier removed a tumor that had destroyed the greater part of the posterior part of the first frontal convolution, and part of the second frontal convolution, there was not the slightest paresis of any of the trunk muscles on the opposite side, even soon after the operation. It is possible that it would require a bilateral lesion to produce persistent paralysis of the trunk muscles. Sherrington also places the center for movement of the eyeballs far forward in the frontal lobe. I think he is correct in this localization also. I recently had the opportunity to observe 2 cases of spasm confined to the face: one of these was a case at the Polyclinic Hospital, that had first been seen by me 7 years ago, and the man returned recently and was under the care of Dr. Stewart. He had Jacksonian epilepsy of the right side of the face, caused by a cyst of the motor area. The other case was one of tumor, operated on by Dr. Frazier. In this case Jacksonian epilepsy began in the lower part of the right side of the face, and extended to the upper part of the face on both sides. Only on rare occasions did it involve the lower part of the left side of the face. Neither of these 2 patients had any spasmodic movement of the eyeballs. I have seen convulsive movements of the eyeballs, when the head was rotated to one side during a convulsion. As in these 2 cases there was no convulsive movement of the eyeballs, I believe that Sherrington is correct in placing the center for these ocular movements at some distance from the center for facial movements. Sherrington showed that by irritating the facial area he could produce contractions in the upper and lower part of the face; but if he removed all this area, he produced paralysis only in the lower part of the face. My observations in the cases referred to, show that a unilateral cortical lesion may cause spasm in the entire half of the face. Dr. Mills has held for a long time that the sensory area is distinct from that for motion, and has placed the former behind the central fissure. I have a patient under my care now who had an apoplectic attack, and who has very little weakness in the left upper limb, but who has complete loss of sensation for touch and position. Such a case shows that the motor and sensory areas cannot be identical, but I am in doubt as to whether the sensory area is *entirely* behind the motor cortex. In one of the cases operated on by Dr. Frazier the center of the tumor was in the Rolandic fissure, and now, some few weeks after removal of the tumor, the man has complete loss of sensation in the upper limb, marked loss of stereognosis and of the sense of position. In the case of tumor of the frontal lobe we should expect failure in the intellectual functions, inasmuch as a large part of the left frontal lobe was removed, and such defect is very evident in memory and judgment.

DR. WILLIAM PICKETT: It has been held that because insanity may arise from lesions in various parts of the brain, mind must be located generally, must be a function of the whole brain, that even the higher psychic processes must be a function of the whole brain. The fallacy of this reasoning lies in the fact that in many forms of insanity the higher psychic processes are not involved at all. To show this, let us take as a starting-point an instance of a woman in this city, who for several years has had hallucinations of hearing to such an extent that she often feels embarrassed, lest she may confuse the imaginary voices with the real voices of those about her. There is considerable evidence that the hallucinations in a case like this are due to excitation of the auditory center in the first temporal convolution, and that hallucinations of other kinds arise from excitation of the respective cortical sense centers. A step farther we meet with those cases of hallucinatory confusion in which voices, visions, odors and cutaneous sensations crowd upon the patient until he is overwhelmed and appears perhaps demented. A close study of these cases shows that the higher psychic processes are primarily unimpaired. A step farther still and we see the true paranoiac of which Dr. Dercum spoke. In true paranoia, the patient, for instance, believing himself to be the Christ, we find hallucinations tallying with that belief. He hears heavenly voices, sees heavenly visions, smells odors from Paradise; he is logical in his hallucinations as in his delusions. What is it that correlates or harmonizes the action of the widely separated sense-centers in this disease? It must be a higher center of psychic function, located perhaps in the prefrontal lobes. It has been said, likewise, that because in imbecility the brain is defective throughout, therefore mind, higher psychic function, must belong to the whole brain. Here again is a fallacy which appears in the *reductio ad absurdum* that mind is in some instances located in the ear and eye; for blind-deaf individuals are imbeciles by deprivation of these senses though they have perfect brains, unless specially trained like Helen Keller. The default of higher psychic function in ordinary imbecility may be partly direct, through impairment of the prefrontal region (abstract concept center of Dr. Mills), and indirect, through impairment of the parietooccipitotemporal region (concrete concept area of Dr. Mills), which fails to supply those simpler concepts and judgments, raw material, so to speak, out of which the higher processes are elaborated in the prefrontal region. The more I have considered Dr. Mills' hypothesis of concrete and abstract centers, the more it seems to me to clarify the subject of psychic localization in relation to insanity.

DR. CHARLES H. FRAZIER: Those familiar with the statistics of the past 5 years must realize that a great advance has been made in the surgery of the brain. There are several factors which may be said to be largely responsible for the better showing, as, for example, earlier diagnosis, improvement in technique and greater accuracy in localization. The question as to the precise situation of the motor areas is one of considerable importance, not only to the neurologist, but to the surgeon. The researches of Dr. Mills, and of others, show that the greater portion, if not all, of the motor area is precentral. My operative experience is rather confirmatory of this view. If any mistake has been made in the position of the flap, it usually consisted in so placing the flap that too large a portion of it was behind the central fissure; and, if my memory serves me right, whenever I have had to enlarge the opening it has always been in the forward and upward direction; that is, in front of and above the central fissure, never in the backward direction or behind the fissure. With reference to the method of exposure, in all of our cases the osteoplastic method was employed. The shape of the flap will differ according to the region it is desired to expose. When we do not wish to encroach upon the region in the neighborhood of the longitudinal or lateral sinuses, the ordinary horseshoe shaped flap will be satisfactory. When it is necessary to expose the mesial surface of the brain or the occipital lobe the flap should be truncated in shape. In the cases upon which I have operated at the University in the past year this plan has been followed out. It seems to me that surgeons might contribute something to our knowledge of cerebral localization if they would lose no opportunity to make observations with the electrode during the course of the operation. We have a scheme at the University Hospital whereby not only these observations may be made, but, what is equally important, that they may also be recorded with great accuracy upon a specially prepared chart. These observations would not prolong the operations, and information would be derived to confirm or disprove the results of experimentation upon lower animals. It is usually believed that operations upon the brain are *per se* extremely serious and that a large percentage terminate fatally. Scrupulous attention to certain important features in technique will give very different results. Of the last twelve craniotomies which I have performed at the University Hospital during the past year, not a single case has been lost from the immediate results of the operation. Economy of time, the employment of such instruments as will fashion the osteoplastic flap in the shortest time and with the least degree of traumatism, the avoidance of unduly rough manipulation of the brain tissue, a resort to the two stage operation in properly selected cases, the most scrupulous observance of all those measures which may be said to be preventive of shock, these are some of the features in the technique, the observance of which I feel quite sure has been responsible for the exceptional record at the University during the past year.

DR. E. W. HOLMES: It is not necessary to a Philadelphia audience to speak of Professor Leidy as probably the greatest scientist the University of Pennsylvania has evolved in the past 50 years, yet, as I remember, he emphasized in his lectures only the fissures of Sylvius and Rolando in my student days, and it was not till in the Philadelphia Hospital in 1880-1881 that Dr. Mills, with his usual kindness, first demonstrated to us the cuneus, the precuneus, the calcarine fissure and the other points in modern cerebral topography, so that Dr. Mills may well be considered as a pioneer in the teaching of this part of the anatomy in Philadelphia. I well remember some 2 years or so after, Dr. Leidy remarking to a friend that he must study up the fissures and convolutions of the brain for his lectures. I am a little surprised at Dr. Mills' strict restriction of the motor and sensory areas in front of and behind the Rolandic fissure; in fact to us, as surgeons, this is a serious matter, we cannot be too careful in our localization here as these are the regions where the operator usually exploits himself. Neurologists tell us the sensory nerves end in minute arborizations, like the finest subdivisions of the twigs of trees, which rather militates against the too strict delimitation of the terminal sensory filaments. The motor nerves, however, begin, they tell us, in the zone of the larger pyramids of the cortex, each filament in its own pyramid, which indicates a much more limited offstart for the motor than for the sensory terminals. The difference in breadth of the motor zone must then depend on the development of the individual. A blacksmith using continually the muscles in greater variety must surely have a broader and deeper motor area than the scholar who is quiescent all day. In time, perhaps, the development of the cerebral cortex incites to greater muscular activity. Thus the difference of opinion in authorities as to the extent of the motor centers may be a matter of individuality; differing in different persons. In a recent case of my own of limited brain cyst in the ascending frontal convolution, where the correctness of localization was proven by operation, there was loss of sensation as well as of motion.

DR. MILLS: I would like to say that my convictions with regard to localization are based largely on personal observations; not that I have not used, as any sensible man should, the work of experimental physiologists and of others. My views with regard to motor localization in front of the central fissure are not based entirely upon the researches of Grünbaum and Sherrington. I have long contended for sensory localization in the parietal lobe. In one of a series of papers which I am preparing I go into the question of the clinicopathologic and other evidence of this localization. I am an extreme localizationist, not a stratifier, but one who believes in increasing differentiation by expansion of surface, by additions of fissures and gyri and changes in their relations to each other. The surface anatomy and the method of evolution of the cortex teach this. By this time the brain would be as tall as a plug hat if new functional areas and centers were accounted for by superimposed strata.

A Note on Brown-Sequard's Paralysis, with Report of a Case in which the Paralysis Followed a Gunshot Wound in the Neck.

BY ALFRED GORDON, M. D.

[Read June 22.]

The symptom-group obtained from a hemisection of the spinal cord has been known from the time of Galen; but Brown-Séquard, particularly in his classical description based upon clinical observations and numerous experiments, has given us an exact picture of the sensory and motor disturbances in mammifera; he has also shown that in man traumatic or other lesions which produce a breach of continuity of one-half of the cord produce identical disturbances. In 1846, while experimenting on animals, like the dog, the rabbit and the guinea-pig, he noticed that a hemisection of the cord leads to the following symptoms limited to the portion of the body which is innervated by the segment below the level of the section: (1) A motor paralysis of the side of the lesion; (2) an anesthesia of the opposite side of the body. In addition to these main symptoms he observed also a few minor symptoms, viz: (1) A hyperesthesia of the paralyzed side; (2) a small band of anesthesia situated immediately above the hyperesthetic area; (3) also sometimes a narrow area of hyperesthesia immediately above the anesthetic band. Conjointly with the hyperesthesia there is also (4) a distinct loss of muscular sense which is not present on the opposite side of the body; (5) exaggeration of tendon reflexes on the paralyzed side or even on both sides; (6) a vasomotor paralysis on the paralyzed side, which is shown by an increase of the temperature as compared with the opposite side; (7) finally visceral symptoms (incontinence of urine and feces); the latter depends upon the segment involved. When the cervical cord is injured, other symptoms will be observed in addition to those mentioned, namely: disturbance of respiration, dilation of the pupil on the side of the lesion, also enophthalmos (paralysis of the sympathetic nerve). This classical symptomatology which was observed on animals can also be observed in man, when the continuity of one-half of the cord is interrupted either by a tumor or syringomyelia, or by a localized focus of myelitis or hemorrhage (hematomyelia), by pressure from another source, or finally and most frequently by a traumatic injury. The patient I have before you presents Brown-Séquard's syndrome, which made its appearance subsequent to a traumatic injury of the spinal cord. His history as taken at the Jefferson Hospital is as follows:

On the twenty-ninth day of December, 1903, patient was shot in the neck, the bullet penetrating the right side, posterior to the sternomastoid muscle in its middle third. There was no loss of consciousness. Patient was removed to the Hahnemann Hospital directly after the accident, and 2 days thereafter was operated on for the removal of the bullet. Through the courtesy of that institution (3-26-04) the following facts were elicited from notes taken at the time the patient was under their care. Diagnosis: Gunshot fracture of the fifth cervical vertebra (Dr. Van Lennep). History of the illness: On Wednesday, December 30. 1903, at 2 A. M., patient was brought to the hospital with a wound in the region of the right side of neck close to the region of the jugular vein. The left pupil was larger than the right, but both reacted. The right lower extremity he could not move, and later the right upper extremity was also involved. The bullet wound was explored, but no trace was found. An incision was made over the cervical spines, the fifth cervical spine being found readily movable. The vertebral arch was pulled away with forceps, as well as the transverse process on the right side. The tract of the bullet was found to extend downward, entering the posterior mediastinum. The patient made a good recovery after the operation. Was discharged February 13, 1904.

At present he presents a scar, surrounded by powder-marks over the region of the middle third of the sternomastoid muscle on the right side, and also a scar about 4 inches in length directly over the ligamentum nuchæ. Patient states that his right arm and leg were paralyzed. The leg began to improve on the twenty-fifth day after he was shot, so that now he is able to walk, although some dragging is noticed in walking. There is still some impairment in power of various portions of the affected limb. There is some foot-drop, the knee-jerks are markedly exaggerated, ankle clonus and Babinski are distinct. No marked spasticity, however, is noticed. The right upper extremity is practically useless. About 2 months ago patient noticed returning motion in the little finger, which has improved, and he is now able to move the other fingers as well as to flex and extend the right hand at the wrist. The paralysis is flaccid, although there is some resistance to passive movement at the elbow. All the muscles of the upper extremity are somewhat wasted, but the atrophy affects particularly the supra and infraspinatus, the pectorales and the trapezius muscles. All the tendon reflexes are exaggerated. On the opposite side of the body there is no indication of impairment of the motor power. The knee-jerk however, is somewhat exaggerated, and there is a doubtful Babinski. Examination for sensations reveals the following peculiarities: While the sense of touch is preserved, the temperature and pain sense are very much impaired. The left upper extremity, beginning on all its aspects at a level of 14 cm. below the acromion, the thorax below the mamillary line and the abdomen on the left, finally the entire left lower extremity on all its aspects, are totally thermoanesthetic and analgesic. Above the mamillary line to the clavicle, also partly on the left side of the face, there is some diminution of sensations of pain and temperature. Over the deltoid muscle there is a slight hyperesthesia, and immediately below a small area of hypalgesia. The disturbance of sensations is strictly and mathematically limited to the middle line of the body. The right half of the body is absolutely normal to all forms of sensation. The only sensory disturbance to notice on the right side is the astereognosis of the hand. The pupils are unequal, left larger than the right; slight drooping of the right eyelid; and slight enophtalmos is present on the right.

To sum up, we have here a motor paralysis on the right side and a sensory paralysis on the left side. This is a symptom-group which we observe in experimental physiology, when a hemisection of the spinal cord is made on animals. It is true that in the latter case we have a few additional symptoms, namely, a slight band of anesthesia on the paralyzed side, a vasomotor paralysis of the same side, visceral disturbances; but these symptoms are not always present in man during life. Nevertheless the fundamental symptoms concerning the localization of motor and sensory disturbances are present here in their entirety. It is therefore a case of typical Brown-Séquard's paralysis. A number of cases reported as examples of Brown-Séquard's paralysis do not all present the typical symptoms as they were observed experimentally in animals: in some of them the paralysis is only partial, in some the sensory disturbances of the opposite side are not clearly cut. In fact the pure type of this group of symptoms is rarely met with. In my case the main symptoms are present in their entirety and in the perfectly typical form, so that from a physiological standpoint it can be considered as one of exceptional value.

The morbid manifestations in traumatic hemisections of the spinal cord are limited to the lower extremities when the injury is below the ninth thoracic vertebra.. In injuries at the level of the upper and middle thoracic vertebræ the thorax is also partly involved. An entire half of the body will show sensory and motor disturbances when the lesion is above the sixth cervical vertebra; in such cases there may also be present symptoms of paralysis of the sympathetic system. As in a large majority of cases the injury occurs in the thoracic region, the disturbances are usually confined to the lower extremities. My case, therefore, can be placed among those that are rarely met with. There are two points in the history of my patient's condition which deserve our attention.

An injury to the spinal cord is usually considered, with very good reason, of a very serious import because of the permanence of the lesions of the central nervous system; and in cases in which we suspect a hemisection we are naturally inclined to give the gravest prognosis. From a medicolegal standpoint it is highly important to be able to appreciate properly the true condition of the victim of an assault. It will be an error to think that when paralysis follows a hemisection of the cord, the patient will remain permanently incapacitated. The truth is that in a large majority of cases great improvement and even functional recovery follow. The reason of it lies in the question of regeneration of nervous elements, which in the state of our present knowledge is accepted as proven.

Clinical experience shows that in lesions below the sixth cervical vertebra the patient has great chances for improvement, while in cases above that level the prognosis should be reserved because of a possible appearance of disturbance of respiration. Our case is interesting from this point of view, that the injury affected the cervical cord at the level of the fifth vertebra, and the patient escaped immediate serious trouble and even great improvement followed in the lower extremity.

It may perhaps be of some interest to see, if our present knowledge of the fine anatomy of various tracts will explain the curious combination of symptoms. As to the motor paralysis in our case, it is easy to understand. A section or a lesion produced in the right half of the cord by the bullet injured the pyramidal tract below the decussation, as the injury was at the level of the fifth vertebra. The very same condition will explain the various reflex phenomena mentioned above (exaggerated reflexes, Babinski, ankle clonus). Far more difficulty we experience in explaining the crossed hemianesthesia. In order that a lesion of one side of the cord should give an involvement of sensations on the opposite side, we must suppose that either the sensory fibers themselves cross each other all along the cord or their collaterals decussate. Anatomy teaches us that the cells of the spinal ganglia send sensory prolongations which bifurcate: one branch is distributed at the periphery in the skin; the other branch serves to form the posterior root and enters the cord. The latter divides in the cord into two branches: one ascending (long), the other descending (short). These two do not decussate in the cord. The sensory impressions which come from the periphery are transmitted through these longitudinal branches, and also through the collaterals which those fibers give up. It is principally Ramon y Cajal who has made us familiar with those collateral fibers. Among the latter there is particularly one variety that concerns us in the case under consideration, namely, the collaterals of the posterior commissure; after they have crossed the median line, they become distributed in the posterior cornua of the opposite side. The paths for sensations of pain and temperature are fibers coming from the posterior cornua of the opposite side. It is, therefore, evident that a destruction of one-half of the cord will unavoidably produce a sensory disturbance on the opposite side. I hasten, however, to add that so simple as the question of sensory distribution may appear. it is far from being solved, as the anatomical data are not yet in entire accord with the clinical and experimental facts. In our case the pain and temperature sense are mainly involved. The lesion can, therefore, be approximately but with a great degree of probability placed in the right side of the cord affecting the pyramidal tract and the posterior cornu on the same side.

The Physical Signs and the Sputum of Incipient Pulmonary Tuberculosis.

BY ROBERT N. WILLSON, M. D.

[Read April 13.]

The following abstract of two phases of an extended study of fifteen incipient cases of tuberculosis seen in private practice, and of seventy-one more or less advanced cases studied in the wards of the Philadelphia Hospital, is presented in the hope that it may lend a new interest to a hackneyed subject—the importance of a careful examination of patients with apparently trifling conditions.

The experience undergone by the writer, during the last year especially, has forced him to the belief that many cases of incipient phthisis are not only overlooked, but that it is a particularly difficult matter to obtain a confirmation of the diagnosis, when it is made in a truly incipient case.

Of the fifteen cases already mentioned nearly all were seen at some time in consultation with other members of the profession, and in only two instances did the consultant find himself able to agree with the positive or even probable diagnosis. Usually the stumbling-block was the absence of tubercle bacilli from the sputum; sometimes it was the lack of fever; often the physical signs did not appear extensive enough; occasionally some one cherished symptom was absent, and until that was obtained the diagnosis was considered impossible. In one case the patient, without the knowledge of the writer, visited three different consultants in this city after hearing his diagnosis of incipient tuberculosis of the lung. Of these one told her that she had only a bad cold; the second told her that she probably had not tuberculosis; and the third (the head of one of our tuberculosis sanitaria) examined her chest through all her clothing and informed her that she had indeed a healed tubercular lesion.

In many of these cases, it may well be stated, tubercle bacilli were at some time sooner or later found in the sputum. In a number the diagnosis was concurred in by Dr. E. L. Trudeau, to whom the patients were finally sent for treatment; among these was the case last cited. All served to illustrate the reluctance of the medical man of to-day to diagnose tuberculosis in the absence of the so-called classical signs.

PATHOLOGIC CHANGES.

The pathologic conditions, whether of the lungs, the bronchi or the glands, in incipient tuberculosis, may be epitomized in the two general terms, *congestion* and *beginning consolidation*.

Probably no one has ever seen under the microscope the earliest changes in a previously healthy lung. The avenue of infection, however, undoubtedly has much to do with the extent of the process at the time when symptoms are prominent enough to suggest an unusually thorough examination. Usually at this time the lesion, while we still rightly term it incipient, has existed for weeks and perhaps months or even years. If the infection takes place through the blood or the lymph-vessels, the first lesion (in adults generally in or near the right apex) is one of slight congestion, due simply and solely to cold, exposure, or exhaustion, or perhaps to a family predisposition, of which we shall say more hereafter. No matter how healthy the patient in appearance when first seen, we may rest assured that there has been some antedating lesion which offered a favorable nidus first for the infection, then for growth and multiplication of the tubercle bacillus. No doubt the first effect of the bacillus is irritative, the influence being exerted upon the bloodvessels which become overful and distended as in any other inflammatory center. The air-vesicles must soon suffer from this congestion, both as the result of pressure, because of obstruction to the venous outflow, and because of the direct influence of the poison elaborated by the bacillus, which is without question invariably present at the site of infection. Often there are isolated areas of pleurisy at the bases or at any possible point over the surface of the lung. Wherever there is such a point of tuberculous inflammation as the latter or such as the congested vesicles, there will be collected broken-down and proliferated epithelial cells, bloodcorpuscles and leukocytes. These still further impede the circulation of and around the vesicles, and furnish in themselves a most favorable culture medium for the bacilli.

If the process commences in or near a bronchus it may be confined to the bronchial tube or its immediately adjacent area. Such cases are frequently noted, in which all physical signs fail and in which sometimes the sputum is swarming with tubercle bacilli.

A gradual increase in the deposit of this collection of blood, epithelium and leukocytes forms, little by little, the beginning consolidation which soon demonstrates its presence by means of characteristic physical signs.

There is undoubtedly, and in every case, a time when there are only catarrhal changes present. I have examined many cases which I believe to have been of such a nature, and later in an instance or two have been forced to watch the consolidation develop. In one case a time could be fixed during which the physical signs changed from those of a normal chest to those of an active involvement. Early changes in the glands must also be those of congestion and, immediately thereafter, hyperplasia and swelling.

When the lesion has advanced beyond these simple primary conditions the case has already passed out of the category of incipient tuberculosis.

PHYSICAL SIGNS.

It is my firm belief that with the veriest beginning of a superficial pulmonary tubercular process, physical signs are present which may always be detected by a careful and trained observer. It is my equally positive conviction that at the present time in nine cases out of ten the earliest signs are overlooked; and that, heretofore, we have passed by the entire number until the symptoms have stared us out of countenance. In the case of a tuberculous process located in the bronchi and the bronchial subdivisions, there are probably no distinctive physical signs. My only excuse for considering such cases here is to emphasize the fact that a patient may indeed suffer from such forms of tuberculosis, and have tubercle bacilli in the sputum, and yet have a symptomless chest. The same statement may be made regarding tuberculosis of the thoracic glands, though at times dulness may be elicited along the spinal gutter, and sometimes an embarrassment of respiration will be noted, which seems to be due to the pressure of a mass upon the respiratory apparatus. It is a not infrequent thing to find, at autopsy, the bronchial glands involved and no other focus of infection.

In considering the physical signs, therefore, of a beginning thoracic tuberculosis, our study is limited, to a great extent, after all, to the lesions of incipient pulmonary phthisis. The conclusions reached at this time are based, first, upon a series of careful observations made in the cases presented in this paper, all of which were seen in the early stages. None of these has up to the present moment progressed beyond the incipient stage, and all appear to be convalescent, the active signs gradually lessening in number and distinctness. Second, there have been included the results of a study of seventy-one cases of tuberculosis in all stages in the wards of the Philadelphia Hospital. In the latter series the physical signs in the lung secondarily involved (this occurring sooner or later in every case) were observed with particular reference to the nature of the lesion probably present. Lastly have been included, though not mentioned in the statistical report, a number of individual cases of incipient tuberculosis occurring in students of the University of Pennsylvania and in several nurses examined at three hospitals.

It is my earnest belief, and one which I see trampled upon every day by our foremost diagnosticians, that there is no one capable of making a thorough and scientific examination of the chest without a complete baring of the skin surface over the part to be examined. I may also say that I have never met with a refusal to expose the skin surface in man, woman or child, after I have explained that only in this way can the examiner be sure of his results, or a trustworthy statement of the condition be ventured. I have seen others pass a patient by with the statement that the lungs were normal, and have myself thought their judgment correct until I proved them and myself wrong after a removal of the clothing. This point is emphasized here because I believe not only that in its observance rests the possibility of the earliest diagnosis of incipient phthisis, but because I am repeatedly seeing cases that have been examined by other men through shirts, dresses or underclothing and sometimes all three. A diagnosis based on such an examination may sometimes be correct and sometimes incorrect, but it is always unwarranted on the premises.

Inspection yields important data, which will be briefly referred to. The general conformation of the face, neck and chest is very important. A thin, pallid subject, with dilated veins, with deep fossæ above and below the clavicles, with winged scapulæ (a so-called phthisinoid chest) and little or no pulmonary expansion, invites the diagnosis of phthisis and often thus invites a positive error. None the less the picture is suggestive, and the further examination often shows, sooner or later, if not at once, characteristic signs of the disease. Cold hands and feet (also often cyanotic) clubbed fingers (more often seen in advanced processes), mouth breathing, a rapid apex beat, and sometimes nodular swellings in the cervical region, all are landmarks, and all add to the probability of present or future tuberculous involvement of some nature. Sometimes a subject appears to the casual observer to be in the bloom of health, with no abnormal physical signs obvious to inspection. Such a case may still be tuberculous. Let me say, however, that when such cases are indeed tuberculous they always present physical signs suggestive at least to careful inspection. With very few exceptions the series of cases presented in this study appeared thoroughly healthy to the eyes of the friends and sometimes of their families.

When a difference can be noted between the pulmonary chest areas (right and left), we have at once a more positive object for our attention. Mensuration will confirm the suspicion suggested by the eye. The expansion over an abnormal lobe is never as free as over the healthy side. The apical swelling on deep inspiration is seldom as full. Exceedingly often there is a depression above or below (or both) one clavicle only. The difference between the supra and infraclavicular fossæ of the two sides becomes more certain during a full inspiration, and the play of the diaphragm (often evident to the eye) is usually less on the affected side. This test may be confirmed by the fluoroscope. Sometimes a depression may represent a retraction of the chest wall at that point; but much more often it is a sign of some condition which prevents inflation of the lung. This condition is frequently enough a tuberculous process to render it a sign of value in the diagnosis of tuberculous disease.

Sometimes, as already noted, nearly all of these signs are absent, and there seems to be next to no abnormality evident to the eye. Let me again say here, however, that I have never seen a case of incipient phthisis without a clamminess and bluish color of the hands that invites attention; and that I have never seen a case of apical involvement in which, after three or four active forced respirations, the abnormal apex did not fail to expand equally with its more normal fellow, and in such a way as to render the difference in the motion of the two halves of the chest evident to the eye. A localized decrease in expansion suggests at once a circumscribed involvement of the lung or pleura. Neither of these signs is pathognomonic of pulmonary phthisis; both suggest a careful study of both lungs from the apex to the base. In no branch of physical diagnosis is a careful comparison of the two sides at every point so imperative, nor so often omitted. Careful inspection is impossible through clothing of any description whatsoever.

Palpation confirms the difference in expansile power between the two chests, and if the sense of touch is delicate it affords even more positive results than does the eye. Only when the two sides are compared is the procedure of any value.

The cyanosis of the extremities has already been noted under inspection, and the lack of circulation is again determined by the touch of the examiner.

Sometimes a difference can be noted in the transmission of the vocal fremitus to the hand (tactile fremitus) on the two sides. The degree of difference depends entirely upon the extent to which consolidation has progressed, and in the earliest stages is not to be detected. As the air-vesicles gradually fill, the fremitus over the affected area becomes relatively more and more distinct, until there is no mistaking the pathologic character of the sign. It must always be remembered that the right upper lobe, and sometimes the entire right lung, normally yields a more distinct fremitus than the left. During the stage of moist congestion, just as in some pneumonias, the fremitus becomes less evident, to become more marked again as true consolidation begins. When a pathologic involvement is suspected on the right side, care is required not to confuse the normal relative difference with a pathologic intensification of the fremitus. When the fremitus is more distinct on the left side, there is no mistaking the suggestiveness of the occurrence, unless the patient be left-handed. In the latter event the overdevelopment of the left side will vitiate the value of the increase in intensity.

Palpation also is of little value in the early stages of pulmonary phthisis, unless the hand can act upon the bare skin, by way of confirming, and often in conjunction and synchronously with, the eye.

Percussion, if rightly employed, often renders valuable aid in detecting incipient pulmonary changes. If carelessly or unintelligently used it is very disappointing. As already stated, I have myself obtained much more satisfactory results in the use of both finger percussion and of a plexor and ivory pleximeter, the sharp note of the latter often giving definite information when the blunt finger note has failed. DaCosta's method of percussing the apices during a held, forced inspiration, and then, after a rest, during forced expiration, often yields differential results that cannot be obtained during ordinary respiratory conditions. Again, a careful comparison of the note obtained in identical positions on the two chests is absolutely necessary in the use of the ivory pleximeter. The latter must not only be held in the same relative position, but the blow should be of as nearly similar force as possible. Often there is a difference only in the pitch of the note, both the finger and the ivory yielding a higher pitch over the area of involvement. In the earliest incipiency absolutely no difference can be detected. Only seldom can the finger detect early differences in the resistance of the tissues. Long before there is present on either side, however, the note that is ordinarily considered characteristic of a consolidation there can be detected by the careful ear a difference between the note on the two sides.

Once more, on the right side (in a left-handed person the left side) the normal note is slightly fuller and lower in pitch than at the same point (all conditions being the same, such as underlying organs, etc.), on the left chest. As soon as the air-vesicles begin to fill with a semifluid and then with semisolid and solid deposits, the pitch of the note obtained thereover becomes higher, and the resonance more and more impaired. It seems hardly necessary to state that only a very clumsy percussion is possible through clothing of any thickness, and careful percussion is only possible over the bare skin.

Auscultation, after all, must be largely depended upon to render the diagnosis possible. Inspection, palpation and percussion may all suggest a beginning tuberculous process in the lungs, but if auscultation fails to confirm their evidence it must be set aside. Many women, for instance, have poorly developed right or left chests, fewer men by far. Many as a consequence present signs suggestive, on inspection and palpation and percussion, of curtailed pulmonary motion and space. Fortunately, however, there are signs very early evident to the careful ear in every case of incipient pulmonary tuberculosis; and these signs, whenever found in a chest, are at once suggestive, and when in association with other signs and a suspicious clinical history, are often absolutely conclusive. Only two conditions, to my knowledge, simulate the early auscultatory signs of pulmonary tuberculosis, viz: influenza and syphilis. When these can be excluded, a positive diagnosis of tuberculosis can be made.

Again it is necessary to say that for satisfactory and accurate results the chest must be bare and the ear trained and acute.

Probably the first change that is noted is a harshness of the inspiratory sound, as compared with that of the well side, or still better, of any normal portion of the lung. Normal respiratory sounds, we have already said, are always soft. As soon as this softness of the breath sounds disappears, pathologic involvement must be suspected. The next suspicious change consists in a lengthening of the expiratory sound, at first very slight, but later such as to render it even longer at times than the sound of inspiration. The personal equation is vital here, but there is no one surely who cannot train his ear (provided he has an ear) to detect the lengthening of the expiratory sound, when it becomes nearly or quite equal in length to that of inspiration. As the vesicles begin to fill, and breathing is attempted throughout the involved area more and more through the bronchial subdivisions and less and less through the vesicles, first the expiratory and soon the inspiratory sound becomes tubular in character. It may very early be even distinctly tubular, provided the process is a rapid one. This change in the breath sounds is as a rule to be noted first posteriorly over the apex of the lung, near the inner angle of the scapula; only later is it heard anteriorly and below the clavicle. In occasional instances this order of appearance is transposed, and the change is first heard anteriorly. It may indeed occur first at any point over the pulmonary surface. *It must not be confounded with the breath sounds which are normally tubular in a small number of chests; nor with those heard normally over the superficial bronchi.* The tubular breathing of incipient phthisis is heard only over the small area of involvement; it is never transmitted to any considerable distance; it is often detected only upon comparison of the two sides of the chest.

As soon as consolidation has taken place, the sound of the spoken voice is transmitted with great distinctness to the ear. Especially the whispered speech is carried with vividness in the entire absence of a cavity. This sign is of double value when the two sides of the chest are compared, as it is never presented by normal tissues. Moreover, it is never simulated over the apex of the lung by any other than a pathologic condition. I have recently observed it in an incipient case which, up to the present time, has been troubled neither with cough nor with expectoration.

Still more important than the foregoing, which may sometimes mark a healed pulmonary lesion, and very suggestive, will be the discovery of fine hair-crackling rales. These are often obtainable only after a cough, are usually heard first posteriorly over the extreme apex, or along the spine of the scapula. Sometimes I have found them only in the axillary space, high up in the armpit. Such rales, when syphilis and influenza can be excluded, offer in most cases the first positive signs of phthisis. If these fine rales, which will never be forgotten when once heard, and resemble closely those of an early croupous pneumonia, occur on only one side of the chest, and over a small area, the exclusion of syphilis and influenza becomes more and more possible. Usually also the rales of an influenzal pneumonic patch are larger and less crepitant. There is no more characteristic sign of incipient pulmonary phthisis than these localized fine rales, and to one who has seen many cases of early tubercular change, they are a dread omen of a long course of treatment and only a probable cure. Often a gentle friction rub accompanies these and sometimes is heard alone.

A phenomenon has recently been described by Cybulski and favorably commented upon by Remouchamps, which is also sometimes evident to the ear, and is caused by the same fine crepitant rales. I refer to a fine crepitation, described by Cybulski as similar to the scratching of a pen, and heard usually at the end of inspiration, with the listener's ear held close before the patient's open mouth. I have studied this so-called laryngeal crepitation in many cases. I have been able to obtain it in some incipient conditions, but have failed in the greater number. It appears to be present in many of the more advanced cases which show fairly loud crepitant rales near the bifurcation of the trachea; but is certainly not even a fairly constant sign of the early tuberculous changes.

Attention may also be called to the fact that the heart sounds become plainer over an area of consolidation and that this fact may aid in locating the lesion in an obscure case.

In commenting on the physical signs as discussed, I would say merely that they are first found in adults, as a rule, posteriorly over or near the pulmonary apex, usually the right. In children they are more frequently detected over the root of one lung, again usually on the right side. In both adults and children they may appear at any point over the pulmonary surface. I would again emphasize a cough as an important influence in rendering audible otherwise latent signs. Many incipient cases present few indications, no case presents none. Even to the dull ear, after a time, there will remain no doubt that something is wrong within.

THE SPUTUM.

Sputum may or may not be in evidence in the incipient case of tuberculosis of the lungs. In my series of cases eleven expectorated constantly a free secretion of mucopus. Three had no sputum except at times when ordinary "colds" were contracted. One had simply a postpharyngeal mucus which could never be obtained for examination. In the bronchial form of the disease the sputum is probably always profuse, and almost from the beginning. In one case it was rarely obtainable even in the smallest quantities, and then only at rare intervals. In another case considerable quantities of pus and blood were expectorated over a space of more than two years, and yet the pulmonary process had advanced so slowly as to cause a doubt in the mind of more than one student of his case as to the exact condition present. Usually the sputum resembles in all respects the yellow mucopus of a coryza or a simple bronchitis. More rarely it is streaked with blood. Usually it contains many colonies of diplococci and often staphylococci or streptococci, or all three. I always look upon the occurrence of tetrageni in the sputum as an incentive to examine more thoroughly for tubercle bacilli; the association is very frequent. Sometimes tubercle bacilli may be found. The most that can be said for the sputum of incipient pulmonary tuberculosis is that it is absolutely atypical unless it contain tubercle bacilli. It should be examined, and repeatedly as soon as there is sputum to examine. Elastic tissue is probably never to be found in the incipient case, and need hardly be anticipated. The sputum examined should be certainly that which comes from the chest cavity, and not that which so often drops back and down from the nasopharynx during the night. The patient should be asked to secure that which is coughed up first in the morning after rising, and not the first clearing of the throat. If this rule be followed much more frequently will definite results be obtained.

THE SIGNIFICANCE OF TUBERCLE BACILLI IN THE SPUTUM.—A much mooted point is the significance of the bacilli in the sputum, and still more doubtful appears to be the import of their complete absence. In one case the diagnosis was first postponed because bacilli could not be found, it was denied by the next consultant in spite of their positive presence, it was deemed improbable by the next because they had been found only occasionally, and the last consultant presumably attached no importance to either their presence or absence. In the first place I would say that I have seen exceedingly few cases of pulmonary tuberculosis in which tubercle bacilli have not been found sooner or later, provided sputum has been present and if the search has been frequent and persistent. Such cases undoubtedly do occur, and there are several included in my series. I have seen many cases in which the sputum was examined in an incomplete and unscientific manner with a negative result; and yet the bacilli were demonstrated by a more systematic procedure from the same specimen. Many such cases will reveal the fact that one or two or three specimens have been examined, often only one smear from each, and often in a manner far from thorough. If it is worth our while to make the diagnosis it is highly important that we prove our ground. In one case nearly one hundred specimens were stained and examined. In the twenty-first and twenty-second of my own preparations, in only one of a series studied by another examiner, and in none of a long series prepared by a third, were tubercle bacilli found. In nearly every case of the series many specimens of sputum showed not a single tubercle bacillus. In the majority a few bacilli were found sooner or later. In one case no bacilli could be found on one occasion, and then weeks later the sputum was swarming with them. In another case no sputum could be obtained; and in still another, though the sputum was profuse and constantly streaked with blood, not one tubercle bacillus could ever be discovered. The latter patient left for the West before an exhaustive study of the sputum could be carried out.

These facts based on actual cases, together with many interesting experiences in the examination of sputum for other observers in the past, have led me to formulate the following conclusions:

(1) Only repeated and systematic examinations of the sputum constitute a careful and conclusive study. A failure to find tubercle bacilli in one specimen has practically no significance. (2) Only fresh sputum is likely to yield bacilli when they occur in small numbers. My experience in this regard is contrary to the usual statement, but is based on many cases and special study of the point in question. (3) Bacilli, though actively at work in the pulmonary tissues, may be found in no other portion of the sputum than the so-called "caseous bodies," and may not be found in these. (4) Tubercle bacilli may be only intermittently present in the sputum of a tuberculous patient. The search, often otherwise unsuccessful, may be rewarded after centrifugating the sputum and examining the precipitated particles. (5) If no bacilli can be detected by the ordinary methods inoculation experiments may prove their presence. Inoculation experiments must be repeated more than once before the absence of bacilli can be assumed. (6) Both staining methods and inoculation experiments may be carried out and still no bacilli be found; yet the patient may be the subject of incipient phthisis and later demonstrate this fact by progressing into the advanced stages of the disease. Such sputum may also infect laboratory animals with tuberculosis. (7) Probably in rare instances tubercle bacilli are found in small numbers by ordinary staining methods in the sputum of normal subjects in ordinary daily life. This has never occurred in my experience and must be an exceedingly infrequent happening. (8) The presence of a few tubercle bacilli in the sputum must be looked upon as confirmatory of suspicious or definite physical signs. In the total absence of characteristic physical

signs, large numbers of bacilli in the sputum probably point to a purely bronchial form of the disease. (9) Only in the complete absence of physical and subjective clinical signs should the occurrence of a few tubercle bacilli in the sputum be minimized. As this coincidence of conditions probably never suggests an examination of the sputum, the circumstance will probably never arise, and probably never has arisen, in which it will be warrantable to set aside the discovery of the bacilli as having no bearing on the case. (10) Typical as well as branched and other atypical forms of the tubercle bacillus may be found in the sputum of incipient phthisis. The most common atypical forms are short, thin rods, nonbeaded but staining characteristically and both acid- and alcohol-fast. (11) Tubercle bacilli should not be looked upon as a customary finding in incipient phthisis. When present they practically determine the diagnosis.

In concluding I would say that there is no question in my mind that a positive diagnosis of tuberculosis should often be made long before fever is present, and long before tubercle bacilli have been found; sometimes before sputum can be obtained for examination.

A probable diagnosis of tuberculosis should be made in any case in which a long persistent and otherwise unexplainable cough is accompanied by either a subnormal temperature or one that rises slightly during the afternoon. When other signs appear, this tentative, care-providing diagnosis will become a positive one. It should never be allowed to *become* positive, however, and the satisfaction of the complete diagnosis should be compensated by the gratification of the cure which follows on the heels of foresight and foreknowledge.

In a recent letter from Dr. E. L. Trudeau, to whose sterling pioneer work I wish to give the credit for much of the inspiration to study along this line, there is a keen sentence: "The average medical man's idea of tuberculosis only relates to the disease after the rational and physical signs have become well marked."

At the present time this statement is unquestionably true. It should not be true, however, a day longer than is necessary for the training of a new generation of medical men, and I was therefore sorry to hear the Health Officer of New York City make the assertion a few nights ago that the general practitioner cannot be expected to diagnose tuberculosis of the lungs in the early stages of the disease.

We should see to it that our sons do not find our eyes and ears grown too dull and our enthusiasm too cold to admit of a careful and brilliant examination of a case by every known method. The result will be as certain as the study will be full of interest.

A Case of Fibromyxosarcoma of the Sacrum of Large Size Successfully Treated by Cataphoric Operations, with Preservation of the Sphincter.

BY G. BETTON MASSEY, M. D.

[Read June 22.]

Mrs. C. A., aged 26 years, the mother of an eighteen-months-old baby, came to me from Royersford, Pa., in October, 1903. Mrs. A. had a history of two difficult childbirths several years before, with instrumental delivery and death of the children, but the last confinement had been normal.

In the spring of 1903 a tumor was discovered in the pelvis. After some delay she consulted a surgeon connected with the Hahnemann Hospital in this city, and on September 6 the latter performed an abdominal section, discovering that the tumor was attached to the sacrum. The abdominal incision was closed, and an unfavorable prognosis given.

The patient then went to Dr. W. W. Keen, of Philadelphia, who is reported to have concurred in the diagnosis of sarcoma, and to have said that an operation for its removal would be dangerous and would probably result in paralysis.

On examination a hard growth was found in the posterior portion of the pelvis. With the examining finger in the rectum this growth was ascertained to be posterior to the rectum and attached to the inner surface of the sacrum by a broad base. It was about the size of two fists and nearly filled the pelvis, the lower border curving back to the sacrum at a point about two inches from the anus. The upper edge could not be reached by the finger.

As the tumor was growing rapidly, it was decided that a desperate effort should be made to destroy it by the massive dissemination of mercuric ions with a strong electric current, under general anesthesia. The necessary batteries were accordingly taken to her home by train, and the kind services of the family physician, Dr. James C. Mewhinney, of Spring City, were enlisted.

The application was made on October 5 at Royersford, with the assistance of Drs. Mewhinney and J. Elmer Porter, of Pottstown, whose effective help I am glad to acknowledge. After the patient was anesthetized and placed on a specially prepared negative pad on a cot, in the Sims position, the skin over the end of the sacrum was incised to admit a sharp-pointed zinc-mercury electrode somewhat larger than a lead-pencil, the unusual thickness of the electrode being arranged to prevent breakage when softened with mercury. Through the slit thus made in the skin the electrode was forcibly thrust into the still healthy tissues surrounding the coccyx and directed upward into the middle of the growth by a finger in the rectum. This route through the healthy tissues above the anus was selected to avoid interference with the anal sphincter, and also because it was anticipated, as it subsequently occurred, that the slough would be too large to come away through an intact anus. A powerful current was then slowly turned on, which quickly developed the ionized chemicals and dispersed them radially from the electrode, necrosing and sterilizing an increasing area of skin, subcutaneous tissue and malignant tissue surrounding the electrode. The current was gradually raised to 1600 milliamperes, after two other electrodes of smaller size had been inserted alongside the first, and was allowed to flow steadily for three hours, when it was turned off and the patient placed in bed.

The conditions present after the application were as follows: A round, grayish-colored area of devitalized and sterilized skin, subcutaneous tissue and sarcoma tissue had been produced with a diameter of about three inches, extending deeply into the growth. The growth itself had become shrunken and softer, as ascertained by the rectal touch.

Owing to faulty arrangement of the negative pad the patient had several bad skin-burns on different portions of the trunk, and these gave her more discomfort during the time she remained in bed than the area treated.

Two weeks after the application there was a sharp secondary hemorrhage from the wound, which was readily controlled by pressure.

On the twenty-first day after the operation three of the bones of the coccyx and about one-half of the tumor came away bloodlessly.

Through the opening thus made it was seen that the whole growth had not been destroyed, a red mass showing plainly at the bottom of the sinus. The finger in the rectum could now be hooked over the top of the remaining portion of the growth. The posterior wall of the rectum had been destroyed, and all fecal movements passed through the wound.

The patient's condition was so fair that a second (and what proved to be a final) application was made one month after the first, or on

November 4, 1903. At this time 1200 milliamperes were turned on and maintained for two hours. Sixteen days later the remainder of the mass came away, somewhat larger than a man's fist, and three days later the detached, devitalized first segment of the coccyx was lifted out of the wound.

During December efforts were made to direct the fecal discharges through the natural anal opening, about an inch below the wound, by inserting hard-rubber tubes of various sizes through the anus to keep it patulous, but the tubes failed to maintain an opening with a proper curve to intercept the dejecta and were finally abandoned, the fecal discharges continuing to pass through the wound until its gradual narrowing, late in the winter, diverted the feces into their natural channel through the anus.

The patient sat up in the second week of December; went downstairs on Christmas day, and walked out January 10. On January 13 she had the first natural movement through the anus.

At the present time, more than seven months after the last application, the patient is in unusually good health, with no evidence of fulness or growth of any kind in the pelvis or elsewhere. She walks and sits easily, and the opening is so small as to scarcely admit a small pea; it is believed that it will ultimately close entirely.

At the time of the second application a small portion of the growth was removed and sent to the Philadelphia Clinical Laboratory for histologic examination. The report characterized the growth as a fibromyxosarcoma.

DISCUSSION.

DR. JAMES C. MEWHINNEY: For the past 18 years I have been the family physician of the patient who has been under my care 3 times during and after confinement, but not very often for any other particular trouble until recently. She did not come under my care for this tumor until after it had been decided that the growth was inoperable. After the first operation the shock was quite severe and the patient suffered a great deal from a generally prostrated condition for 3 hours. After that by careful nursing and most excellent attention upon the part of the patient's mother, she gradually gained in strength until the second operation, about a month after the first. At the second operation she was under ether nearly 3 hours. She rallied well and there was no secondary hemorrhage as there had been on the fourteenth day after the first operation. I am pleased to say that the work has been almost a complete success; as reported by Dr. Massey there is still a little opening where the primary electrode was introduced, but this is so small that dejecta can hardly pass, and we look for the feces to come through the natural anus ultimately.

PROCEEDINGS

OF THE

Philadelphia County Medical Society.

A Note on the Role of the Thyroid Gland in Exophthalmic Goiter Associated with Paralysis Agitans.

BY ALFRED GORDON, M. D.

[Read September 14.]

The pathogenesis of Graves's disease is still a subject of discussion. The partisans of the theory of hyperthyroidization, as well as those who believe in a nervous origin of the disease, particularly in that of the cervical sympathetic system, all report proofs in favor of their respective views. However, an impartial analysis of facts, clinical, as well as experimental and pathologic, compels us to look at the disease in question as having a nervous origin. In a contribution published in the *Philadelphia Medical Journal* in 1900, the writer discussed at length the various theories and reviewed critically all the accumulated data concerning the physiology and the pathology of Graves's disease; from this study he arrived at certain therapeutic suggestions. It is necessary to recall a few facts in order to emphasize the importance of the subject we have before us to-night. Scientists generally admit that in exophthalmic goiter all the phenomena are the result of a permanent irritation of the vasodilator nerves situated in the sympathetic nerve (classical experiments of Dastre and Morat), and, as the vasodilators of the head and heart have their deep origin in the medulla, it is there that we must look for the explanation. The sympathetic nerve sends nervous filaments to the bottom of the orbit, thyroid gland and cardiac plexus. With a permanent irritation of the vasodilators coming from its center there is a constant afflux of a considerable amount of blood to the thyroid gland and hypertrophy of it follows. The dilation of the retrobulbar vessels leads to protrusion of the ocular globe and we have exophthalmos. The filaments going to the heart give rise to tachycardia.

The advocates of the opposite view maintain that the irritation of the sympathetic nerve, which produces the above-mentioned symptoms, is caused by the excessive secretion of the thyroid gland and consequently by accumulation of the surplus of thyroidin, the normal function of which is to neutralize the toxic products of the organism. Whether the syndrome of the affection under discussion is due to an initial irritation of the center of the sympathetic system and to a secondary irritation of the thyroid, or to an initial disturbance of the function of the thyroid and a secondary irritation of the sympathetic, it is impossible as yet to state. The fact nevertheless remains, that the thyroid gland is involved, and in order to interpret properly the disturbances which we may encounter in the course of Graves's disease, we must turn our attention to the physiology of the gland and to the consequences which its pathologic condition leads to. Shiff, in his Untersuchungen über die Zuckerbildung in der Leber, 1859, was the first to call attention to the fatal effect of thyroidectomy. Reverdin and Kocher have shown that tetany and myxedema may follow extirpation of the thyroid. Experimental researches have shown that the effect of this ductless gland is various: in some cases the nervous system alone suffers, in others the general nutrition. The suppression of the function of the thyroid produces myxedema, exaggeration of its function is one of the symptoms of Graves's disease. In both cases there is supposed to be a toxic condition of the organism. That thyroid autointoxication exists was proven by the studies on toxicity of the tissues, blood and urine. Ughetti, Mattei and others found that the blood of a dog, in whom the thyroid was removed, had no effect on a normal dog, but produced a continuous tremor in an animal whose thyroid was extirpated. Gley, Vassali and Generali extirpated the parathyroid glands and this was followed in the course of a few days by a generalized tetany. Gley saw fibrillary contractions produced by the blood of an animal in which the thyroid was destroyed. Multiple changes in various organs were found after thyroidectomy, as, for example, dilation of the bloodvessels, changes in the hepatic and renal cells; but the most important changes are those of the nervous system. It appears that the brain, cerebellum, medulla and anterior cornua of the spinal cord are the seat of the lesions. According to the experiments of Vassali and Donaggio degenerative changes were found in the pyramidal and posterior tracts. In MacCallum's findings marked chromatolysis of the motor cells of the cortex and cord was distinct, while *ad vitam* tetanic convulsions, or pronounced depression, were present after extirpation of the parathyroid and thyroid glands. It is true that it is difficult as yet to appreciate the real value of all these findings and the real nature of the poison which produces those lesions; it is nevertheless important to recognize the relationship between various affections and disturbances of the function of the thyroid. Our knowledge of the ductless glands, although in its infancy, nevertheless widens from day to day; more and more facts are accumulating, and all tend to show the great multiplicity of morbid symptoms produced by removal or alteration of function of those mysterious organs. The doctrine of internal secretion of these glands must be accepted, as it explains many physiologic phenomena heretofore obscure.

In December, 1903, I had the honor of reporting before this Society facts concerning the occurrence of diabetes mellitus and myxedema. A careful analysis of all the data and a close observation of the symptoms before and after the treatment, showed clearly the great dependence of these two morbid conditions upon the deficient thyroid function. To-night I bring before you another interesting and instructive occurrence of two morbid conditions, in which again the thyroid undoubtedly plays some rôle.

The history of the patient is as follows:

Mrs. A. D., aged 39 years, whose previous personal and family histories are negative, noticed 8 years ago, after her last confinement, a gradually growing goiter. Two years later she began to be nervous, irritable and shaking of arms and legs soon made its appearance. Within the two following years the tremor spread to the head and body. At the same time she began to suffer from shortness of breath with palpitation of the heart on the slightest exertion. Shortly afterward she noticed a gradually developing staring of the eyes. Other symptoms soon made their appearance: drowsiness with an imperative desire for sleep, "sinking" spells and headaches. About a year ago the patient noticed a rigidity of the trunk and of the upper extremities. The following symptoms were stated when she presented herself at the Jefferson Hospital for examination. Face thin and flushed, with mask-like expression, features show immobility of muscles. Eyes, while not very protruding, are nevertheless distinctly staring and widely open. When patient is told to look downward, the upper lid does not follow completely the downward movement of the globe; von Graefe's sign is therefore very suggestive. There are also nystagmiform movements upon lateral movements of the eyes. Pupils are equal, react normally to light and accommodation. There is high hyperopia. Eyegrounds are normal. At the base of the left side of the neck there is a large mass, evidently an enlarged thyroid. The goiter is soft and not distinctly pulsating. Measurement at the base of the neck over the center of the goiter is 32.5 cm. The examination of the heart shows a pronounced tachycardia without murmurs, but with a marked accentuation of the first sound. The maximum intensity of the heart beat is in the 7th intercostal space, external to the mammillary line. The pulse is rapid and small, beating around 140 per minute. The patient's carriage and attitude suggest rigidity of the vertebral column, but there is no real stiffness, as passive movements of the trunk are possible. The arms and especially the hands are in a characteristic position. The rigidity is only apparent. The body is bent forward, but again there is no real rigidity. When she sits down, gets up or turns, the whole trunk moves like one rigid mass. The thumb is applied against the other fingers. A fine tremor is present in both hands, which increases at each voluntary act. The tendon reflexes are exaggerated. The gait is shuffling, the steps are short. There is the so-called propulsion movement; when the patient is slightly pushed forward, there is a tendency to move forward for a certain length of time. The speech is rapid, monotonous and is no more varied by emotional expression than is the face; she runs words and sentences together. The mental faculties are normal. To sum up, we are in the presence of a symptom group constituting Graves's disease associated with Parkinson's disease. Exception may be taken to the slight degree of exophthalmos, but it is to be remembered that this symptom may be manifested only in a "staring" of the eyes without a real prominence of the eyeballs. And on the other hand, there are cases of Graves's disease without exophthalmos. However, the goiter, tachycardia and tremor are present and marked. As to the paralysis agitans, the attitude and carriage of the patient, the stiffness and fixation, the expressionless facies and the propulsion are sufficient signs to make the diagnosis at first glance. The tremor, however, is not very distinct, but a close observation will tell an experienced eye that the tremor is that of paralysis agitans.

The pathogenesis of paralysis agitans is undergoing the same fate as that of other functional nervous diseases. The microscopic findings of the cases of Parkinson's disease as reported by competent and reliable observers lead to no definite conclusions; while in some cases they are contradictory, in others they are distinct. There are, however, some records, which show a more or less constant condition, viz.: that of the bloodvessels; thickening of the intima and media with cellular infiltration are the usual changes found in the majority of those cases, which presented pathologic conditions under the microscope.

The fact that the clinical manifestations are so constant, is sufficient to admit the existence of a certain influence, be it a toxin, which bears its action upon the same nervous elements in every case and produces the characteristic rigidity, tremor, etc. We also know that toxic elements in a great many cases alter first of all the bloodvessels and the nervous elements suffer secondarily. The history of syphilis is the best illustration. Clinically intoxicants like mercury and arsenic are, among other symptoms, followed by a tremor resembling that of paralysis agitans or of exophthalmic goiter. In the present state of our knowledge we are not in a position to define precisely what particular portion of the central nervous system is affected in paralysis agitans, no more than in chorea and in other neuroses. We can only state the fact that the function of the cerebro-spinal axis is disturbed.

Since no external agent, introduced into the system, is apt to produce the symptom group in question, we are bound to address ourselves to the agents within us, which are indeed so abundant. Autointoxication must be thought of and various obnoxious elements thrown into the circulation by various glands disturbed in their function must be taken into consideration. The internal secretion of the ductless glands must be here again referred to. The thyroid with the parathyroid, thymus, pituitary body, pancreas, adrenals, are all organs, the intimate nature of which is not elucidated in its entirety, but we are already in possession of quite a large number of facts showing clearly their relation to each other, also the effect of their disturbed functional activities upon the system. Here we have two diseases in the same individual, whose thyroid gland does not supply the necessary element (whatever it may be) for neutralization of the poisonous material secreted by various organs; or else from the fact of being large or perhaps hypertrophied the thyroid supplies in excess the above-mentionel neutralizing element with this result, that in itself is apt to act prejudicially on the organism. In my judgment it is the question of more than a mere coincidence, as similar facts were reported by others. In 1883 Moebius, reporting a case of association of Parkinson's and Graves's diseases, raises the question whether the diseases are not due to a pathologic condition of some gland with an internal secretion. The same view he expressed also in 1898. In 1891 Landberg reported a case of paralysis agitans associated with myxedema, and the postmortem examination showed an atrophy of the thyroid gland, which, in the author's opinion, was the cause of both maladies. Let me only call your attention to a fact reported by the Italian writer, J. Codina Castelloi in *Revista de Medicina y Cirurgia practicas,* 1903. He performed two autopsies (patients died having paralysis agitans): in one he found the thyroid gland sclerosed, it weighed only nine grams; in the other the gland was in a state of cystic degeneration. Clinically he also obtained very encouraging results with thyroid treatment.

Other so-called functional nervous diseases have been reported in association with Graves's disease, as, for example, chorea, epilepsy. Facts of this nature are accumulating and perhaps they are more frequently met with than reported. There is undoubtedly a wide field for physiologic and chemic research, which will some day elucidate one of the most obscure questions of medical science. No doubt therapeutics will largely benefit by it. The subject is captivating just because of its obscurity.

DISCUSSION.

DR. GORDON (in reply to a question by Dr. Curtin) said that he had seen one case of Graves's disease associated with Addison's disease 9 or 10 years ago in Paris, in the service of Lancereaux. This was also an example showing the probable effect of the internal secretions of the ductless glands.

Ready Methods of Formulating Modified Milk Mixtures.

BY E. KIRKLAND SHELMERDINE, M. D.

[Read September 14.]

Modified milk mixtures when intelligently prescribed have been the salvation of thousands of children's lives. This method is the only known one whereby the relative proportions of proteids, fats and carbohydrates can be increased or diminished independent of each other. There are two ways of acquiring creams of certain percentages and a fat free milk: The first is by arrangement with a milkman of sufficient intelligence and the necessary apparatus to produce a cream of a standard percentage.

It is necessary for him to have a centrifugal machine and a milk tester. After the cream has been drawn off by centrifugation, the residue of the milk is practically fat free—less than 0.2 per cent. The cream varies in percentage and must be standardized. A 20 per cent. cream makes the best working basis. After the cream is procured by centrifugation, it should be tested by Babcock's method and the percentage of fat estimated. If, for example, the cream tested 50 per cent. fat, by diluting the cream one and one-half times by volume with fat free milk, would give a cream of 20 per cent.

Rule: The fat percentage of the centrifugated cream divided by

20 per cent. (standard working cream) gives plus one more dilution than is necessary.

Examples: Centrifugal cream—60 per cent. fat: 60 per cent. ÷ 20 per cent. = 3: 3 — 1 = 2 dilutions. Twenty quarts of 60 per cent. cream diluted twice by volume of fat free milk gives 20 per cent. cream.

Centrifugal cream—48 per cent. fat: 48 per cent. ÷ 20 per cent. = 2.4: 2.4 — 1 = 1.4 dilutions. Twenty quarts of 48 per cent. cream diluted 1.4 times with fat free milk gives a cream of 20 per cent.: 20 quarts × 1.4 = 28 quarts. By adding 28 quarts of fat free milk to 20 quarts of 48 per cent. cream gives 48 quarts of 20 per cent. cream.

Centrifugal cream—54 per cent.: 54 per cent. ÷ 20 per cent. = 2.7: 2.7 — 1 = 1.7 dilutions. Thirty quarts × 1.7 = 51 quarts. By adding 51 quarts of fat free milk to 30 quarts of 54 per cent. cream gives 81 quarts of 20 per cent. cream.

The requisite amounts of cream and fat free milk are taken from the milkman, measured in a graduate by the mother or nurse, pasteurized if necessary, and sufficient boiled water, lime water and milk sugar added according to the directions of the attending physician.

This ideal way is not practicable in all places; there might not be enough coöperation among the physicians to create a sufficient demand to warrant a milk firm producing a fat free milk and a standard cream.

The second way is for the mother to procure a cream of a known percentage from ordinary milk.

A series of milk tests which I have made, extending over a period of three months, have demonstrated the following facts:

(1) After milk stands a certain time, and most of the fat has risen to the top, the cream layer decreases in volume, but increases in fat percentage, due to the gravitation of the particles of milk which have been carried up by the fat droplets.

(2) The percentage of fat in the cream layer of milk (of the same age and kept at the same temperature) of different richnesses, is relatively the same. The richer the milk, the proportionately greater is the volume of the cream; and conversely the poorer the milk, the smaller by volume is the superimposed cream; but the percentage of fat above the line of demarcation between cream and milk is the same in rich and poor milks which have stood the same length of time and under the same conditions of temperature, etc.

(3) Milk which is bottled in the evening (as is the custom among the large dealers of Philadelphia), if allowed to remain for six hours on ice after delivery in the morning, will give an average percentage for the cream (above the line of demarcation between the milk and cream) of 13.33 per cent.

(4) The lower one-quarter of the milk will give a fat percentage of less than 1 per cent., and for all practical purposes can be considered fat free. When diluted to make the modified milk mixtures, the attenuation of the fat is so great that it influences the fat percentage of the mixture to an infinitesimal per cent.

After the milk has been allowed to stand for between six and seven hours, it is siphoned off in the following manner: A handle of a knife or some small object is inserted under one side of the jar so as to tilt it, bringing the lowest center of gravity to one side. A very good siphon is made by taking a straight medicine feeding tube and attaching a small caliber rubber tube (twice as long) to one end: in addition an eight ounce graduate is necessary. The rubber tube is compressed close to the junction with the glass tube, so as to prevent any ingress of cream or milk until the bottom of the milk jar is reached by the free end of the glass tube. The tube is gently inserted until the free end is at the lowest point of the jar, *i. e.*, the lower tilted side; the compression of the rubber is released and the milk allowed to enter the tube. The graduate is placed at a lower level than the jar, suction is made on the end of the rubber tube, the first teaspoonful is allowed to escape; then the lower one-quarter of the milk in the bottle is run into the eight ounce graduate. Then the rest of the milk is siphoned off until the lower cream level is at the bottom of the jar and no more of the lower white milk can be seen; the fluid is then carefully allowed to run until the yellow color of the cream shows coming out of the end of the tube, when the flow is stopped, the tube elevated and the contents of the tube allowed to run back into the jar.

The cream remaining in the jar averages 13.33 per cent. fat. The milk in the graduate, which was drawn first, is fat free milk (practically). The middle part of the quart is not used. It is unnecessary to add that, before and after using, the graduate and siphon should be thoroughly scalded, and that the greatest care should be taken to have all the utensils absolutely sterile.

READY METHODS: Modified milk mixtures have been a thing of mystery to the profession at large; while to a certain extent they subscribe to its usefulness in the hands of the specialist, yet from its extreme complexity and the innumerable tables of calculation, they have not taken the time to memorize a table of percentages and proportions. Also, when in a patient's house, they have not cared to take a table out of their pockets and scrutinize it for the purpose of telling the mother how much cream, fat free milk and milk sugar are necessary to make a mixture suitable for the child. They have as much hesitancy as in resorting to a printed book of prescriptions and copying a cough mixture.

In the following calculations any man, who can multiply and subtract, can calculate in a minute the amount of cream, fat free milk and milk sugar necessary to make any desired percentages. The following calculations are for 20 ounce mixtures; if a greater or less amount is needed, increase or decrease proportionately.

Fat: Using Cream Containing 20 Per Cent. Fat.—Rule: Percentage of fat prescribed (used as a whole number) represents the number of ounces of 20 per cent. cream to be added to a 20 ounce mixture, in order to obtain a prescribed percentage of fat in the mixture.

Example: If 2 per cent. fat is prescribed, 2 ounces of 20 per cent. cream are added to the 20 ounce mixture; if 3 per cent. fat is prescribed, 3 ounces of 20 per cent. cream are taken; if 1 per cent. fat is prescribed, 1 ounce of 20 per cent. cream is taken, etc.

Using Cream Containing 13.33 Per Cent. Fat.—Rule: Percentage of fat prescribed (used as a whole number) represents two-thirds of the number of ounces of 13.33 per cent. cream to be added to a 20 ounce mixture, in order to obtain a prescribed percentage of fat in the mixture.

Therefore the number representing the percentage of fat prescribed (used as a whole number), increased by one-half, gives the number of ounces of 13.33 per cent. cream to be used in the 20 ounce mixture.

Example: If a 2 per cent. fat is prescribed, 3 ounces of 13.33 per cent. cream are added to the mixture; if 3 per cent. fat is prescribed, 4½ ounces of 13.33 per cent. cream are taken; if 1 per cent. fat is prescribed, 1½ ounces of 13.33 per cent. are taken, etc.

Using a 10 per cent. cream, twice the percentage of fat prescribed, used as a whole number, represents the number of ounces to be used.

The number of ounces of cream can be calculated instantly: if a 20 per cent. cream is used, take as many ounces and fractions of ounces as there are units and fractions of units in the prescribed percentage; 13.33 per cent. cream, increase by one-half; and 10 per cent. cream, double.

Proteids.—To calculate the number of ounces of fat free milk to be taken in addition to the cream, in order to give a prescribed percentage of proteids is equally simple, only more figuring is required.

For every 5.71 ounces of milk (cream and fat free milk) diluted to 20 ounces, the percentage of proteids in the 20 ounce mixture is increased 1 per cent. The percentage of proteids prescribed is to 1 per cent. as 5.71 is to the number of ounces of milk necessary to make a prescribed percentage of proteids in the 20 ounce mixture.

Rule: Multiplying 5.71 by the percentage of proteids prescribed (used as a whole number) gives the number of ounces of milk to be added to the 20 ounce mixture, in order to give a prescribed percentage of proteids. The number of ounces of cream already added is subtracted from this result and the remainder is the number of ounces of fat free milk necessary to bring the mixture up to the prescribed proteid percentage.

Example: We wish to prescribe 2 per cent. fat and 0.5 per cent. proteids. $5.71 \times 0.5 = 2.85$ ounces of milk to be added to the 20 ounce mixture. The 2 per cent. fat required 2 ounces of 20 per cent. cream, $2.85 - 2 = .85$ ounce of fat free milk to be added, in addition to the 2 ounces of cream, to bring the proteid percentage up to 0.5 per cent. Adding 2 ounces of 20 per cent. cream to ¾ ounce (approximate) of fat free milk and diluting to 20 ounces, gives 2 per cent. fat and 0.5 per cent. proteids in a 20 ounce mixture.

Note: While the proteid percentage is not as high in the cream as in the fat free milk, yet the difference is so slight that the ultimate result answers all practical purposes.

Sugar.—To calculate the amount of milk sugar to be added to a 20 ounce mixture to bring the percentage of sugar to the prescribed percentage.

Rule: Multiply the sum of the cream and milk used for the fat and proteid percentage by .2; subtract the product from the percentage of sugar prescribed; multiply the remainder by .2. The result represents in ounces the amount of milk sugar to be added to make a prescribed percentage of sugar in a 20 ounce mixture. Reduce to drams.

Note: This rule is calculated on a 4 per cent. basis of sugar in cow's milk; if the sugar is higher, even as high as 5 or 5.5 per cent., it will make very little difference in practical results, as only a small percentage of the sugar in the 20 ounce mixture is derived from the added cream and milk, but comes mainly from the added milk sugar.

Diagrammatically the calculations can be expressed as follows:

Fat.—Cream, 20 per cent., = in ounces the percentage prescribed. Cream, 13.33 per cent., = in ounces 1½ times the percentage prescribed. Cream, 10 per cent., = in ounces double the percentage prescribed.

Proteids.—

5.71 multiplied by per cent. of prescribed proteids, expressed as units, gives
ounces of milk necessary to make a prescribed proteid percentage.
Minus ounces of cream already added, gives
ounces of fat free milk to be added.

Sugar.—

Number of ounces of cream and fat free milk used.
Multiplied by 0.2, gives
Result 1 = percentage of sugar in the 20 ounce mixture from the added cream and fat free milk.

Percentage of sugar prescribed.
Minus result 1, gives
Result 2 = percentage of sugar necessary to bring the 20 ounce mixture up to the prescribed percentage.
Multiplied by 0.2, gives
Ounces of milk sugar necessary to bring the sugar in the 20 ounce mixture up to the prescribed percentage. Reduce to drams.

A few minutes spent in going over the following example will explain more thoroughly than words can. With my system it is not necessary to carry a table; when a physician understands the system, he can figure it out in a minute on the back of a prescription blank, and write down for the mother the relative amounts of cream, fat free milk, sugar, lime water and boiled or sterile water sufficient to make 20 ounces of the different percentages he wishes to prescribe. In intelligently using modified milk mixtures, the physician will not only achieve much more brilliant results than is possible under a starch soaking process, in which the other ingredients are all out of proportion and the percentages are not what nature intended a nursing child to have. Not only will the physician, who scientifically cares for his infant patients, have better results, but he will also have the reputation in his community, and Soakum's Baby Food will not be placed on a pedestal in his patient's house a crying advertisement of the lack of skill in the attending doctor.

Example: Fat, 2 per cent.; proteids, 0.75 per cent.; sugar, 5 per cent. Cream, 20 per cent., requires 2 ounces; cream, 13.33 per cent., requires 3 ounces.

Proteids.—

5.71 ounces, when diluted to 20 ounces, = 1 per cent. proteids.

.75 prescribed proteid percentage.

4.2825 ounces of milk necessary to make 0.75 per cent. proteids in 20 ounce mixture.

2.00 ounces of 20 per cent. cream added.

2.28 ounces of fat free milk to be added in addition to 2 ounces of 20 per cent. cream.

Using 13.33 per cent. cream.

4.28

3.00

1.28 ounces fat free milk to be added in addition to 3 ounces of 13.33 per cent. cream.

Sugar.—

4.28 ounces of milk diluted to 20 ounces to make prescribed fat and proteid per cent.

.2

.856 per cent. of sugar in 20 ounce mixture containing 4.28 ounces of milk.

5.00 per cent. (prescribed sugar).

.856 per cent. of sugar in 4.28 ounces of milk diluted to 20 ounces.

4.144 per cent. of sugar necessary to bring the 20 ounce mixture up to 5 per cent.

.2

.8288 ounces of milk sugar to be added to make prescribed per cent. (5 per cent.)

8

6.6304 drams.

One dram of milk sugar equals a heaping teaspoonful, the sugar to be poured from one spoon to another, so that it is not packed tightly.

The physician writes either of the following directions for the mother, according to how the milk is procured.

If the 20 per cent. cream and fat free milk is procured from the milkman:

Cream, 2 ounces.
Milk, 2¼ ounces.
Lime water, 1 ounce.
Boiled water, 14¾ ounces (enough to make 20 ounces).
Milk sugar, 6¾ heaping teaspoonfuls.

If the mother prepares the cream and fat free milk from ordinary milk, the physician should, the first time, show the mother how to siphon the milk, and explain to her that it should be left on the ice and not disturbed from between six and seven hours.

Cream, 3 ounces.
Milk from lower 8 ounces of quart or 4 ounces of pint, 1¼ ounces.
Lime water, 1 ounce.
Boiled water (enough to make 20 ounces), 14¾ ounces.
Milk sugar, 6¾ heaping teaspoonfuls.

The keys to the system are the numbers 5.71 and 0.2; these two numbers carried in the head, and the knowledge of how to use them, are all that is necessary in estimating a modified milk mixture; 5.71 for the proteids and 0.2 for the sugar.

The character of the stools and the progress of the child will be indications of which constituents of the milk need to be increased or diminished; under this system they can be regulated at will. The more a man works with modified milk mixtures, the more quickly will he learn where an increase or decrease is necessary. After a few months he will appreciate—as do those who have had experience with this manner of feeding—that modified milk mixtures give the most satisfactory and permanent results. "As the twig is bent so the tree inclineth"; the regulation of the dawn of existence determines the health of after adult life. Patent baby foods are sometimes justifiable as a temporary expedient, but as a steady diet they are harmful and their baneful influences are more and more appreciated as time passes.

Report of a Case of Subphrenic Abscess, Illustrated by Skiagraph.

By G. E. PFAHLER, M.D.

[Read October 12.]

The diagnosis of subphrenic abscess is often quite difficult. This is shown by the fact that cases have been misdiagnosed by some of our most skilful diagnosticians. In a report of five cases by Osler, three were misdiagnosed. (*Canadian Practitioner*, May, 1893.) In the third case, the diagnosis of septic pleurisy passing on to empyema and perforation of the lung was made. At autopsy, an abscess was found behind the left kidney and descending colon, extending from the diaphragm to the crest of the ilium. In the fourth case, the diagnosis of empyema was made. At operation, a large subphrenic abscess was found and evacuated. The fifth case, one of acute rheumatism, developed the signs of empyema during convalescence. At operation, only 100 cc. of clear serum were removed from the pleura. A large subphrenic abscess was found and evacuated.

Since the diagnosis is difficult, every new or additional method of investigation that is at our command should be used, My principal object in reporting this case is to call attention to the confirmatory evidence that may be obtained from the use of the X-rays.

The patient, Mr. J. D., aged 32 years, was admitted to the wards of the Medico-Chirurgical Hospital, and sent to the care of Dr. George W. Pfromm. By mistake, I studied the case and called the surgeon. Dr. Pfromm has very kindly permitted me to make a report of the case The patient was a street-car conductor, and had been well until 10 days before admission, when he complained of soreness in the abdomen. He had a chill and vomited. He was up and about until 3 days before admission, when he went to bed on account of weakness and pain in the back. He was admitted to the hospital February 18, 1903, when his chief complaints were weakness, pain in the back and nausea. He was sent to the hospital with a probable diagnosis of typhoid fever. His temperature was 101.6°, pulse 108, and respirations 32. His appetite had been lost, and his bowels had been irregular during the preceding 10 days.

Physical examination, briefly, showed a poorly nourished white man, under average size, and having the general appearance of weakness. Skin was of a muddy color, and showed a profuse perspiration. Eyes showed a yellowish tinge of the conjunctiva, and dilated pupils. Mouth showed normal mucous membrane, but the tongue was heavily coated, moist and tooth marked. Chest showed no expansion in the right lower axillary region. No vocal fremitus could be felt below the fifth rib anteriorly, and the seventh rib posteriorly. Fremitus was normal elsewhere, except a slight increase at the right apex. Percussion gave impaired resonance at the right apex, and dulness below the fifth rib anteriorly, and the seventh rib posteriorly. The dulness was not movable, and did not change with change of position. It was clearly not the normal line of liver dulness Breath and voice sounds over this area were absent. The lower border of dulness of the liver extended 1½ inches below the costal border in the midclavicular line and showed distinct tenderness. Abdomen. The right side was red from the effects of a mustard plaster. There was rigidity in the right iliac fossa, with tenderness extending back to the right lumbar region. There appeared to be a mass in the right iliac region. The right thigh was flexed upon the abdomen, and gave rise to pain when extended. Rectal examination elicited tenderness and resistance at the end of the examining finger. The heart showed a diffuse apex beat, a slight increase in the area of dulness, a weak muscular sound, otherwise nothing abnormal. The spleen was slightly enlarged. Urine analysis added nothing of importance. Blood examination showed: Hemoglobin, 85%; red corpuscles, 4,360,000; white corpuscles, 32,200. The differential count showed. Polymorphonuclear cells, 90%; large mononuclears, 8%; small mononuclears, 2%; no eosinophiles.

X-ray examination, showed a haziness of the right apex, a sharp rising curve of the right side of the diaphragm. The right side of the diaphragm was absolutely immoble, while the left side moved 2½ inches, which is above the normal, A skiagraph was made and developed later. The diagnosis of subphrenic abscess secondary to an appendiceal abscess was made. One of the assistant surgeons, Dr. W. L. Laws, was promptly called. He believed, on account of the rather exhausted condition of the patient, that it would be better to wait until morning to do the operation. On the morning after admission, Dr. Laws made an incision in the right lumbar region, and removed about 1½ pints of pus. Immediately after the evacuation of the pus, the line of dulness at the base of the right chest corresponded to the normal upper border of the liver. The patient lived about 30 hours after the operation, and died, apparently, of general toxemia. Autopsy was absolutely refused.

I will not take the time to draw a clinical differential diagnosis between this and other conditions which simulate it. I have not been able to find any other case in which the X-rays have been used to assist in the diagnosis of this condition, and, therefore, I shall dwell particularly upon this point. In this case, I had made the diagnosis, and called the surgeon before I used the X-rays, but still I feel that it gave confirmatory evidence.

In making an examination of the diaphragm with the X-rays, both the fluoroscope and the skiagraph play an important part,. In making a fluoroscopic examination for any condition of the chest, probably the most important study is that of the diaphragm. In this study we must include its curve, its position and its movement. Its position and curve can be equally well studied from the skiagraph, but its movement can be best studied with the fluoroscope.

Normally, the position of the diaphragm is about one-half inch higher upon the right side than upon the left, and the dome is usually on a level with the tenth rib in the midscapular line. The line curves downward then about three-quarters of an inch near the spinal column. At the outer side of the chest, it curves downward about an inch and a half. It may be displaced upward by new growths, ascites, cysts, abscess, adhesions from above or collapse of the lung. It may be displaced downward from above by new growths, fluid accumulations or pneumothorax, or it may be drawn downward by adhesions from below. The curve will be influenced by the same conditions.

A study of the movements of the diaphragm is most important, since it will, at times, be one of the earliest indications of disease either above or below the diaphragm. For instance, one of the earliest signs of incipient tuberculosis of the lungs is a diminution in the movement of the diaphragm on the affected side. In turn, all of the diseases of the lungs or pleuræ, the inflammatory or painful conditions of the abdomen, or of the diaphragm itself will influence this movement.

Time and space will not permit of a complete differential diagnosis of all of these various conditions skiagraphically. I will, therefore, simply point out the evidence of disease, or, in other words, the evidence of a subphrenic abscess studied from these three points.

In this case, the position of the diaphragm on the right side was on a level with the ninth rib in the midscapular line, instead of the tenth rib, which would be normal. The diaphragm on the left side has taken a lower position than normal. The right lung just above the liver and diaphragm is clear, which indicates that no adhesions are present, also that no empyema is present which is often confounded with subphrenic abscess.

The curve of the diaphragm has also been altered so that it may be seen to rise about one-half inch higher as we go beyond the midscapular line. Normally, the curve is downward after leaving the midscapular line. This is strong evidence that there is something abnormal between the liver and the diaphragm.

The fact that the diaphragm did not move during respiration was seen by the fluoroscope, but may also be seen in the skiagraph. This skiagraph was made about a year and a half ago, when I was in the habit of making these exposures about two and one-half minutes. In this time of course, the patient breathed many times, and ordinarily the shadow of the diaphragm would have been diffuse. In this instance, however, the line is quite sharp and indicates no movement. No movement with clear lung above is strong evidence of some inflammatory or painful condition.

These three points, therefore, indicate an inflammatory accumulation between the liver and the diaphragm, which could be little else than an abscess.

In conclusion, the diagnosis of subphrenic abscess is often difficult. The X-ray examination should be added to the clinical investigations, and to insure greater accuracy both a fluoroscopic and a skiagraphic examination should be made.

DISCUSSION.

DR. CHARLES LESTER LEONARD: I want to emphasize particularly the value of fluoroscopic diagnosis and its limitations. This means of diagnosis is valuable in detecting abnormal motion. Dr. Pfahler pointed out to you that he was able to differentiate between the motion of the diaphragm on the left and on the right side and to show a variation in that motion. He has shown that the short exposure, which we are now able to make, detects that motion, but in order to see the motion you have to produce a series of skiagraphs and show them in the ciniometograph. The eye can detect that motion, and with careful study it is able to detect the difference between the normal and the abnormal. The detection of the minor details is not so easy on the fluoroscope, and we must be careful how we accept diagnoses made entirely by the fluoroscopic method. As Dr. Pfahler said, the method is valuable for its confirmation of other methods of diagnosis rather than for its direct value as a new method. One great difficulty at the present time in the use of the X-rays is that people seem to think that the man who employs it wishes to use that method of diagnosis only. The skilful and conscientious diagnostician wishes to use every method that will add to his knowledge in determining the conditions present and help him to determine the methods of treatment. The X-rays are valuable as a confirmatory method in diagnosis and as an adjuvant in therapeutic work in combination with other methods of treatment.

DR. W. L. RODMAN: I have used the device just exhibited by Dr. Pfahler in class demonstrations, and a week ago was able to show beautifully a double dislocation at the elbow joint and an accompanying fracture of the epicondyle. I know of no condition so frequently incorrectly diagnosed as subphrenic abscess and anything which throws additional light upon it should be most gratefully received. One point is of particular interest after reading the statement of Dr. Kärte, of Berlin, that subphrenic abscess, in the majority of cases, is secondary to suppurative appendicitis. Nearly all authorities speak of it as being practically the result of gastric ulcer perforating into the lesser peritoneal cavity. Another point brought out in the paper is that the dulness in subphrenic abscess is irregular in outline; a differential feature between that condition and empyema.

DR. G. E. PFAHLER: Much valuable time is saved, and a greater amount of information imparted when an X-ray negative can be demonstrated to a whole class at once. The untrained eye cannot see and appreciate all of the pathologic lesions, unless they be of a very gross nature. At the Medico-Chirurgical College we, therefore, find this little device which I have constructed most useful. It consists of a box containing a bank of thirty small, frosted lamps at its bottom. The top of this box is covered over with ground glass and the whole is mounted upon a portable stand which folds like a music stand. The amount of current is controlled by a rheostat.

The Therapeutic Uses of X-Rays.

BY S. MASON McCOLLIN, M. D.

[Read October 12.]

I suppose the aid in diagnosis by the use of the X-rays is so permanently established that it is not worth while to say anything to you on that subject. But in regard to the results obtained by it in its uses as a therapeutic agent there has been some difference of opinion expressed by different operators, probably due to a difference in mode of application.

It, however, at the present time, has been proven an efficient remedy in many diseases which previously have been considered incurable. The results, in the hands of those who have had proper experience with it, show that the X-rays have a decided effect on the cells of malignant growths, altering their character so as to produce changes in their formation, retarding the growth, causing degeneration or absorption, preventing spreading, causing the ulcerated surfaces to heal entirely and leaving the parts entirely cured.

In superficial cancerous growths the results have been markedly good, especially about the face, where the skin regains its health without the unsightly scars following the use of the knife.

I have with me a patient who suffered with epithelioma of the lips, which was so extensive that several surgeons declined to operate upon it. I commenced using the X-rays about the middle of July, treating it daily for the first two weeks; since then, about every third day. The lips are healed. There is only a large gland under the jaw, which is not more than one-half its original size.

One case of malignant growth of the breast, which had been twice operated upon, on account of rapid recurrence, with an ulcerated surface five by eight inches, was relieved of all pain, skin formed over the ulcer and life prolonged nearly one year.

In deep-seated growths results have not always been so good but the relief of pain and the general improvement in health have been well marked in the majority of cases.

In the case of a woman with symptoms of carcinoma of the stomach, examined and diagnosed as such by two reputable physicians, the swelling entirely disappeared and the patient was relieved of all clinical evidence of the disease.

We all acknowledge, however, that every patient cannot be cured; but if they can be helped and the pain relieved, it is indeed a great thing accomplished.

I would especially draw your attention to the advisability of employing the X-rays after all surgical operations for malignant growths, that the patient may have the benefit of the destruction of such cells as may remain after every such operation, and thus prevent a return.

My experience with X-rays in many skin diseases has been very satisfactory. I have found them almost a specific in chronic acne that has resisted all other treatment.

Growths that are not malignant are often benefited by the use of the X-rays. A case of interest was one in which three warty and very painful tumors appeared on the sole of the foot. These had resisted all previous treatment, but were entirely cured by a few applications of the X-rays, the growths disappearing, leaving the skin of the foot smooth and in a healthy condition.

Enlarged tuberculous glands are absorbed and sinuses healed, though the process is often tedious. The glands should be removed by the knife and then followed by X-ray treatment.

I trust I have succeeded in impressing upon some of you the value of X-ray treatment as a therapeutic remedy, especially following operations for malignant tumors.

DISCUSSION.

DR. CHARLES LESTER LEONARD: I would like to make a plea for a more liberal use of the X-rays in treatment. The beautiful demonstration of what it can do in a case of epithelioma of the lip, which has been presented, is enough for us here to realize what is possible. The difficulty at present is that the X-rays are being asked to cure practically dead patients. We get them when the surgeon won't touch them, when they are *in extremis*, and it is a wonder that we produce the results we do. What we want is the coöperation of the medical men and the surgeons, to help us to use an agent which has been shown to have such power. No one denies the efficacy of operation as a method of removing malignant disease from the body, but it is not a cure; it is simply a removal of that disease and the surrounding normal tissue from the body. We have found in the X-rays an agent which has certain definite physiologic properties, that produce changes in the growth and in the virulence of the cells, which we call malignant disease. That growth, that malignancy, is something which we cannot explain. We have the clinical demonstration of an influence upon this malignant disease, which we have nothing like in experimental or practical therapeutics, and why the profession should not use every effort and every opportunity to employ this agent is more than can be understood. The agent has demonstrated itself as a force in combating malignant disease, and if it is used in conjunction with operation we should practically be able to cure the majority of cases. The difficulty to the operator is that cases do not come early enough. That a cure can be effected if malignant disease is found early and removed, is the statement of the surgeons, and this is borne out by statistics. The best means we know is early radical operation, and if to early radical treatment we add the supplementary treatment by the Röntgen rays we combine the 2 methods which scientific medicine has shown most effective in treating this scourge of the human race. There is no reason why surgeons should not refer their patients early to the X-ray men, or why they should not treat their patients themselves, if they are competent in the use of the X-rays, after their operation. One treatment does not contraindicate or hinder the other. The healing of wounds is much more efficient and rapid under the X-ray treatment than without it, ulcerating areas and skin heal more kindly. The X-rays will penetrate the dressings, unless they contain some opaque antiseptic; and, with the present aseptic treatment of operation wounds, it is possible to treat patients with the X-rays just as soon as the operation is finished. If the X-rays are efficient in the cases sent to us, practically moribund, in which the surgeon refuses to operate, it is apparently possible and highly probable that the X-rays would be more efficient in the cells lowered in vitality after operation and the combination of operation and postoperative treatment ought to produce the best results in malignant disease. I wish to emphasize particularly that it is the duty of the physician who desires to see the best results to have malignant disease operated on as early as possible, if operation be possible, and to supplement that operation by the thorough Röntgen treatment of the disease and the diseased area.

Dr. G. E. Pfahler: The experience of the X-ray men is that epithelioma involving the lips does badly, and it is a great satisfaction to see the result in this particular case. Speaking more generally of the value of the X-ray work, I agree thoroughly with what Dr. Leonard has said. We do get most of our patients almost in a dying stage. At the present time I have 4 cases of mediastinal growth under treatment. One of them was referred to me by Dr. Noble 5 months ago, and in it he had removed what he could of a mass in the axilla, the patient having a distinct prominence or tumor involving the sternum and physical signs indicating mediastinal involvement; the skiagraph showed the same. The patient to all external appearances is in perfect health to-day. The mass left in the region of the right axillary vessels has been reduced to a mere scar, and the mediastinum, I believe, is nearly clear; at least, the physical signs are very indefinite. The other 3 cases are quite recent, and I can say nothing as to the result. In carcinoma of the uterus we have our most difficult point of attack. All the cases I have treated have been far advanced and inoperable. Two have apparently recovered. I have a case at the present time referred by Dr. Noble in which he removed what he could of the mass in the region of the uterus and found the rectum involved, and could not do a complete operation. I started treatment on that case five months ago. The patient is able to come to my office; for the past 3 months she has been able to have her bowels moved without purgatives, and hemorrhage has ceased. I cannot call her well and doubt whether she will be well, but in such an advanced case the result is encouraging.

DR. JOHN B. ROBERTS: I would like to ask the X-ray men to give us their opinion of the difference between the action of the X-rays and radium upon sarcoma and carcinoma, whether it be scirrhus or epithelioma. They talk of malignant disease; but do not make the clinical distinction between types of malignant disease. I would be glad to know whether they do make a distinction between the effect of these methods of treatment upon sarcoma, epithelioma and the ordinary cancer; and whether they have arrived at any distinct dosage. In a case of sarcoma, which has been under a long series of X-ray and operative treatments, in conjunction with the toxins of erysipelas, I have been unable to get the X-ray expert, who has charge of the case, to give what seems to me to be a sufficient dose. It seems to me that when you have a case which needs radical treatment, it needs radical treatment with the X-rays as it needs radical treatment with the knife, if that is the remedy to be used. Is any definite dose determinable, or do the X-ray experts use the treatment once a day or twice a day, for 10 minutes or for an hour, without as yet any definite or accurate system of dosage? I have been unable from the discussion to get these points cleared up in my mind. Dr. Leonard has said properly that the operative treatment should come first, to get rid of the abnormal tissue, and that that should be supplemented by the X-rays. Does he mean that the scar should be subjected to X-ray exposures a certain number of times; if so, how many times, how often and to what extent? When, in other words, do surgeons and others become conscientiously guilty if they neglect to use these very proper remedies, radium or X-rays or both ?

DR. WILLIAM S. NEWCOMET: I am glad to hear Dr. Roberts speak as he has, although I think that most operators understand the amount of X-rays to be given in certain cases. The question is not so much one of dosage as it is the selection of the proper case. Some time ago in a paper upon this subject I expressed the opinion that the best results in this field were upon what might be termed the chronic malignant growths. On the other hand, acute cases will develop metastatic processes while the original focus is being treated. Often we will treat such cases and find the local process healing nicely, while the general condition of the patient is going from bad to worse, and sooner or later the mystery clears up by the discovery of a new process at some distant part of the old disease. This is quite common in cases of carcinoma of the breast. Dr. Coley, of New York, if I am correct, has made the statement that he has never seen a case of sarcoma cured by the X-rays. No doubt they are very rebellious as a class, but I think the statement expresses a wrong opinion. In regard to Dr. Leonard's reference to the treatment of cases without removing their dressings, I might say that I saw cases treated in the London City Hospital where the only protection that was given to the surrounding parts was gauze wet with water.

DR. CHARLES LESTER LEONARD: I would like to answer Dr. Roberts, if I may. A dose of X-rays is practically the same as the dose of any other drug or remedy; it depends upon the individual and the case. We differentiate between the therapeutist who uses his drugs, digitalis or strychnin, by rule of thumb, and one who uses drugs according to his case. That is absolutely essential in X-ray therapeutics. We have determined the dosage and the quality of the rays, up to the present time, which has to be used in the treatment of different forms of malignant disease. The treatment for epithelioma, for carcinoma and for sarcoma are practically widely different. We have the use of rays, which approximate those of radium, for the treatment of epithelioma, a tube of very low vacuum. We have a medium ray used for the treatment of carcinoma, and we have a higher penetration used particularly in sarcoma. The application of these rays differ. The differences in the type of tube and its position in relation to the patient have to be taken into account. In the treatment of deep growths, the tube is placed at a greater distance, so that the rays shall be of a more uniform character. The distinction is very marked between the kinds of treatment for various forms of malignant disease and the method of treatment. That has not been referred to to-night, because a study of technic would lead the discussion too far afield. The treatment of sarcoma has been shown to be most effective when it has been divorced completely from operation. Dr. Witherspoon, a surgeon of St. Louis, told me that he had 2 cases that were inoperable which were completely cured by X-ray treatment without operative intervention. I have a case which I hope to present before one of our societies, of a man who had a mass in the tonsil filling the pharynx and external fossa. It had been diagnosed as an inoperable sarcoma by a number of prominent surgeons. Under Röntgen treatment the growth disappeared and the man has been at work for over a year. The case was referred to me by Dr. John B. Deaver as inoperable. I have numerous similar cases that I have reported in literature. Hard growths are more amenable to X-ray treatment than the soft, and the less rapid growths are more amenable than the rapid. The beneficial effects seen in healing are noted in difficult cases where skin defects and ulcerating areas remain to be healed.

DR. MCCOLLIN: I am glad that Dr. Roberts spoke in regard to the dose of X-rays. I think the trouble is that we do not realize that we want to get the effect, and that this is to be obtained only by experience. Many are using the X-rays with a small machine who have no idea of the higher therapeutic effect. In many cases we must use them almost to the burning point, and then the effect is very rapid. When we get a dermatitis we have an effect which is encouraging. I did not go into the technique in my paper, because I knew that it would take up too much time.

The Value of Stereoscopic Skiagraphy with Practical Demonstration.

By MIHRAN K. KASSABIAN, M. D.

[Read October 12.]

The paper which I am about to read deals with a subject that is unfamiliar to some of you, it not having been presented before this society up to the present time, although it was first employed in this country and subsequently used abroad, viz., the application of the principles of stereoscopy to the art of skiagraphy. To-night I will briefly explain its principles and its technique and a few improvements that I have made in developing the method and making it more practical and simple. These improvements, which will be demonstrated later on, I have no doubt, will be interesting to medical men as well as to surgeons.

Photography vs. *Skiagraphy.*—There is a misunderstanding among laymen and even among professional men as to the two terms, photography and skiagraphy. A photograph is an image produced on a sensitive plate in a camera by the ordinary light, reflected from the surface of the object, converging and passing thither through a lens or pin-hole and then diverging and falling, producing a reduced size of the image on the plate. Therefore, we call a photograph a "reflected" picture, and we see only that part of the object that is near or toward the optical perimeter if the object is not transparent; if it is transparent, then the refraction obscures the clearness of the farther side.

In skiagraphy, on the other hand, working with X-ray apparatus, the X-rays emanate from a small point (anode), and diverge and pass through opaque bodies (to ordinary light), and throw a relative shade of the object on a sensitive photographic plate, producing merely an actual silhouette. Therefore, an X-ray picture or skiagraph is produced by transmitted light.

For instance, if we examine the hand with the fluoroscope or skiagraph, the shadows are the same when looking from the dorsal as when looking from the palmar side of it, the shadows having equal sharpness, there being no refraction.

When we look at photographs which are taken with one lens (as if with one eye) and skiagraphs made in one direction, there is only a flat picture, with no perspective and no relief effect.

The Purpose of Stereoscopy.—The ordinary photographs and images look flat, as if seen by one eye, the reflection of one plane; while stereoscopic pictures, which are made by two lenses, each being two and one-half to two and three-quarters inches from each other (corresponding to the distance between the two pupils of the eyes) will be impressed on the retina as one picture, thus giving a perspective view.

Stereoscopic Fluoroscopy.—The stereoscopic fluoroscope consists of a fluorescent screen illuminated by two tubes which spark alternately. A rotating disc with appropriately placed slots eclipses each eye alternately. This works synchronously with the sparking of the tubes. Each eye sees the shadow cast by one tube. A stereoscopic image is thus seen on the screen, the movements of the shutter, etc., being sufficiently rapid to give a continuous illumination of the screen.

Stereoscopic fluoroscopy is very interesting indeed, it being possible to see foreign bodies in their exact position, not as in an ordinary picture. But unfortunately, this method is impractical for several reasons, the complexity of the apparatus, expense, the bulk, etc.

The Technique of Stereoskiagraphy.—The technique briefly consists of taking two separate skiagraphs of the same part, on two different sensitive plates, without changing the position of the parts, but displacing the position of the Crookes tube two and one-half to two and three-quarters inches (6 cm.), corresponding to the distance apart of the pupils of the eyes. Afterward these two negatives or skiagrams should be examined with a special instrument. The part on which the stereoscope is to be used should be first fluoroscoped or skiagraphed in order to have an exact knowledge of the location of the injury present. This is most important.

For use in stereoscopic work, there is a slot changing box, measuring fourteen by seventeen inches, the top of which is of thin wood or hard fiber. The size of the plates are marked upon this top in order to correspond to the dimensions on the drawer of the box. Over this box is placed crossed wire, which facilitates the accuracy of superposition while using the stereoscope. The best method in taking stereoscopic pictures is to have a horizontal bar, scaled in inches and centimeters. First center the object, then move the tube to the right, corresponding to the vision of the right eye (one and one-quarter inches), and take a picture. Place a fresh plate in the drawer of the box, which can be done without moving the object, and move the tube to the left, corresponding to the view from the left eye, and take another picture. The plates should be marked "right" and "left," in order not to confuse them after the picture is taken.

Some operators use two Crookes tubes at a distance of seven to eight centimeters, and do not move the tube at each exposure. The objection to this method is that two different tubes will not have the same degree of vacuum, and there is danger of puncturing the tube.

Johnson and Czermak prefer to move the box two and one-half inches instead of sliding the tube.

I have devised a special table and adjustable plate-holder, which, to my mind, have many advantages over the other devices in many respects.

This table is so constructed that the tube can be placed to slide on a rod with great ease either on the top, bottom or side, without discomfort to the patient.

Usually in skiagraphing for either simple or stereoscopic purposes the part is placed over the table or changing box, and the weight of the patient rests upon the plate, thus displacing or changing the original position of the foreign body. Therefore, the device above mentioned is of advantage in this respect, since by its use the part may be placed in a natural position, without the plate changing frame touching it at any point.

In order to produce two negatives of "equal density" the degree of penetration of the rays should be as equal as possible. There are no two tubes that have the same degree of vacuum, and the same tube changes its vacuum during the exposure. The operator should judge the time of exposure of the second plate from experience. A self-regulating tube is preferable in all cases. I have been in the habit of giving a little longer time for the second exposure than the first, as the tube runs down a little and the penetration lessens. Short exposures are most desirable.

In order to have two negatives of equal density, the process of development should be carried on with great care. The developers should be the same for both. I have been developing two exposed plates in one tray, with the same duration of development, but lately I have discarded this method on account of having larger plates, because putting them together and handling them together is difficult. Therefore, I now develop them separately, and by carefully mixing the developer before and during the progress of development I alter it as the plate requires. The duration of development will be regulated according to the degree of density desired; soft negatives are preferable.

METHODS OF EXAMINATION OF STEREOSKIAGRAMS.

Wheatstone's Reflecting Method.—This instrument was devised in 1838, and consists of two vertical mirrors accurately set at a right angle, the vertex of the angle facing the middle line of the observer's forehead. This arrangement of mirrors slides to and fro, and is placed over a long board, upon which a vertical frame is parallel with the reflecting plane, and forms an angle of 45 degrees. These frames and mirrors are so constructed that the observer can easily superimpose the two pictures.

In placing the pictures in this frame, it must be borne in mind that they must be so placed as to hold the same position in the vision as that occupied by the Crookes tube during exposure. For instance, the picture marked "right" should be placed in the frame to the right of the observer in order to get an anterior view of the part. If placed in the left frame, a posterior view will be obtained. When prints are examined with reflected light, by turning the prints end for end, without changing the "R" and "L" positions, posterior and anterior views may be obtained. This process is a very interesting and valuable one in skiagraphy.

The advantages of the Wheatstone's Reflecting Method are as follows: Any size negative, even before a print is made, can be viewed. When negatives are used without prints, the pictures is seen more in detail; negatives can be examined while wet. I have made two holes in a block of wood which is placed between the reflecting mirrors, where the same reflecting light used for negatives can be placed for illumination of the prints.

Brewster's Refracting Method.—Brewster's refracting or lenticular stereoscope, which is well known, is based on the principle that two pictures are produced by a displacement of two and one-half inches, being placed side by side and viewed with two prisms (eighteen degrees) for each eye. These pictures will superimpose according to the laws of refraction. One disadvantage of the Brewster's refractor is the great degree of convergence of the axis of vision, which is necessary. Also it is necessary to reduce the size of the pictures for use in this refractor.

Reduced Stereoskiagrams.—(1) Transparencies: Make reduced pictures from the original negatives in the same manner as making transparencies or lantern slides (size, three and one-half by three and one-half inches), and mount them on a fine ground glass (four by seven inches), and view them with an ordinary hand stereoscope. (2) Reduced prints: From the transparencies or lantern slides make prints and mount them in two ways. By reversing the "R" and "L" prints, two views of the subject will be observed, and this proves very convenient in studying them, as dorsal and palmar, or anterior or posterior views may be observed.

These reduced sized pictures may be put over the desk in the office as a specimen of fracture, foreign body, thorax or skull, for study or to show to the patient.

THE ADVANTAGES AND PRACTICAL USES OF STEREOSKIAGRAMS.

As already pointed out, an ordinary skiagraph is composed of pictures of different densities, which when superimposed look flat and on one plate, and the many shadows are indistinct and weak, but in a stereoscope the superimposition will be more distinct and visible.

The value of stereoscopic skiagraphy is self-evident, as you will see by the practical demonstration with the different methods of observation. Some of the values of this method are as follows:

1. *Anatomy.*—For demonstrating the structure of the bones. In both long and short bones the trabeculæ are seen, and in the long bones we may see the arrangement of the lamellæ in the shafts and in the cancellous tissue. The spiral arrangement of the lamellæ is distinctly shown, especially in the humerus and femur, as also is the change in their direction near the articular surfaces, bringing them into columns perpendicular to the surface of the pressure.

In examining the dry skull the groves for the meningeal arteries are seen, the concave appearance of the skull processes, the frontal sinuses, the antra of Highmore, the turbinated bones, etc. It is very interesting to view these results in the living subject as well as in the skeleton. I am now making a series of experiments with Professor M. H. Cryer in order to study the anatomy of the face.

In studying the mechanism of the joints, these pictures give a perspective view of the relations of the articular surfaces of the bones and the actual depth, and the relation of the processes to the observer.

Arteries, veins, bronchi and excretory ducts, when injected with opaque materials, such as lead or mercury, show their exact relations (their depth) to the bones, the muscles, etc.

Surgery.—There are, of course, numerous methods of localizing *foreign bodies*, but stereoskiagraphy is the most satisfactory, giving as it does a definite view of the foreign body, enabling the surgeon to operate with certainty.

The foregoing statement is also true with regard to *fractures*. The method procuring definite views of injuries, namely, the exact position of the fragments, the amount of overlapping, the separation, the degree of apposition in deformities, etc. The ordinary skiagraph does not show the variety and character of a *dislocation*. The stereo-skiagraph, however, overcomes this difficulty, producing a clear and definite view of the existing condition, so as to differentiate between an anterior and a posterior dislocation. In viewing the thorax we may see either an anterior or a posterior aspect, depending on the position of the plates. The heart, its position; the aorta, its relation to the vertebral column; the beautiful cage appearance of the thorax, the location of a cavity or consolidation, etc., are interesting and fascinating from a practical and scientific standpoint. I have been employing this method of stereoscopic skiagraphy in the Röntgen Ray Laboratory of the Philadelphia General Hospital for nearly every case.

In closing I desire to express a wish that the members of this Society will be enough interested in the good results of this method to employ it in preference to ordinary skiagraphy. I ackowledge that it requires more time and care, but I believe the results obtained compensate for these seeming disadvantages.

DISCUSSION.

DR. J. L. BORSCH: Dr. Kassabian's method will be of inestimable value to surgeons and especially to ophthalmologists in locating foreign bodies in the eye. I would like to ask him whether it makes any difference in taking a stereographic picture of the inside of the hand, if the hand is displaced to the right or left. Also what is the explanation of our ability to see the same picture, of say the hand, from both the palmar and the dorsal aspect by simply reversing the picture in the stereoscope, when such a picture is taken from one aspect only.

DR. KASSABIAN: In reply to Dr. Borsch's question, I would say that when the pair of stereograms, either negatives or prints, are put in the stereoscope in a reverse order; viz, right negative, which should be viewed with right eye. is placed to the left and viewed with left eye, and *vice versa*, in the axis of movement of the focus-tube, the phenomenon known as the "conversion of relief" will appear. For example, negatives "R" and "L" of the hand in their correct order give us a palmar view. But when the "R" negative is viewed with left eye, and the "L" negative with right eye, we see the dorsal view of the hand. This phenomenon is also called "pseudoscopic." This is a great advantage in skiagraphy, for we will be able to have both views of the part. This is due to the fact that skiagraphs are composed of many superimposed layers of the part. This, I hope, will explain the cause of the "conversion of relief" or "pseudoscopy."

PROCEEDINGS

OF THE

Philadelphia County Medical Society.

Case of Typhoid Fever Complicated by Appendicitis, Operation, Recovery, followed by Pleurisy with Effusion, Pneumothorax; Ultimate Recovery.

By Moses Behrend, A. M., M. D.

[Read October 26.]

The occurrence of appendicitis in typhoid fever is uncommon. Most text-books speak of its existence under the discussion of perforation. In some treatises its existence is not even mentioned. In later years, however, on account of the prevalence of appendicitis references to the subject are available.

At Johns Hopkins Hospital, where the work on appendicitis and perforation in typhoid fever has received universal recognition, the physician and surgeon are closely associated. Osler pointed out the beneficial results of these consultations a few years ago. The warning then given benefited me while an interne at the Philadelphia Hospital.

A little after midnight my attention was called to a patient in the ward having typhoid fever who developed tympanites with a pronounced fall of temperature. The liver dulness was partially effaced, and I immediately sent for a surgeon. He operated, but did not find the perforation, although the evidence of its existence was plainly seen.

The patient died, and at autopsy the perforation was found adjacent to the gall-bladder.

McCrae and Mitchell divide the cases of appendicitis occurring in typhoid fever into two groups: (1) Cases strongly suggesting appendicitis; (2) appendicitis developing in the course of typhoid fever.

Most of the cases belong to the first class. They cite three cases that had symptoms of appendicitis but recovered without operation. They also report one case that developed appendicitis on the tenth day of the disease. The patient died, and at autopsy the appendix was found acutely inflamed.

To the above should be added another group of cases which occurs long after the patient has recovered from his typhoid fever, and due to Eberth's bacillus.

Holman relates a very interesting case in which the patient developed appendicitis and cholecystitis, five and seven months, respectively, after his attack of enteric fever. The typhoid bacillus was found on bacteriologic examination.

In the case under discussion the most important events will be reviewed, and full clinical notes are omitted. The history is as follows:

S. N., aged 33 years, Chief complaint, headache and general muscular pain. Family history: Father died recently, aged 86 years; mother living and well; 5 brothers and 5 sisters living and well; one brother and one sister were overlain by their mother and smothered to death. Previous history: The patient has never had any severe sickness; he had gonorrhea once; he drank alcohol moderately. Present history: On May 3, 1904, the patient came to my office complaining of general discomfort, loss of ambition, headache, myalgia and cough; there was no fever and no history of nosebleed.

A few days afterward the patient again visited me with the above symptoms intensified. In addition he felt hot and cold at intervals. His temperature was slightly above normal.

I then advised him to go to bed, which he did very reluctantly. The temperature then rose, and from May 7 he developed a severe attack of enteric fever. The predominant symptoms in the first 3 weeks were extreme nervousness, insomnia, and diarrhea. The patient was very restless, tossing himself from one side of the bed to the other. Physical examination revealed an enlarged spleen and some abdominal tendencies.

Severe muscular twitching, resembling convulsive movements, was present. His condition became alarming on account of the extreme nervousness and insomnia. Various remedies were used with very little benefit.

A consultation was advised, and Dr. Eshner saw the case with me. We agreed that hypodermic injections of morphin be given to control the paroxysms. The temperature was high and reached 107° by rectum on May 18. The pulse was only 120.

The mental agitation kept up until May 21, when just the opposite condition ensued. The patient now slept almost continually and had to be awakened at times for his ice-pack and nourishment.

For 4 days a condition of mental hebetude existed, which state gradually grew more profound.

Early in the morning of May 25, the patient apparently collapsed; this was followed by a slight chill, which was thought to be a return of the nervousness.

About 6 A. M. of the same date the abdomen became enormously distended; it was tender and board-like rigidity was universal. There was no vomiting, but the liver dulness was slightly effaced. The patient was unconscious, features were pinched, lips and finger-nails were blue, hands were shriveled, the temperature remained 105° F., but the pulse became rapid and weak. The patient seemed to be on the verge of death. Perforation was first thought of, and this diagnosis was accordingly made. No blood count was taken.

Drs. Teller and Musser were called in consultation. We all agreed that perforation had probably taken place, and Dr. Musser advised immediate operation.

Operation was refused early in the morning on account of the poor state of the patient, but he recovered so quickly later in the day that interference seemed justifiable.

My patient's wife objected to his removal to a hospital. Accordingly the patient was prepared at home and operated upon on a kitchen table with due aseptic and antiseptic precautions.

Having in mind the possibility of appendicitis, the incision was made to the right of the rectus muscle. On opening the abdomen no escape of gas was noticed, but upon searching for the appendix we found it adherent and full of feces. The vessels around the appendix and the ileocecal valve were congested. The cecum was adherent, and on opening the appendix it was found inflamed and swollen. The adhesions were freed; the appendix was delivered, ligated, removed, and the stump inverted.

After a diligent search no perforation was found, no thin walled ulcer was noticed; in fact no intestinal ulcers could be outlined. The great distension of the intestines hampered us considerably.

The abdomen was filled with normal salt solution and closed. Hypodermoclysis was also given. The patient recovered quickly from his anesthetic, after which the most marked change occurred in his mental condition. The patient spoke rationally, his face assumed a natural hue, he recognized the people around him, but still could not realize what had transpired.

Six hours after the operation he had 5 bowel movements, which greatly relieved the distension. The following day (May 26) the distension still continued, necessitating the use of active measures.

The temperature again became gradually higher. On account of the abdominal wound and bed-sores, some difficulty was encountered in using ice-packs. Ice-water enemas were relied upon, and the legs and arms were packed in ice.

On May 31 the wound was dressed and found infected. The stitches were removed and the line of incision was partly opened and drained. The walls of the wound were lined with a necrotic membrane having a foul odor.

June 3. The temperature varied from 101–105°. Pulse 120–140, and respiration 34–42 for the first few days. The patient seemed distressed, his breathing was labored and rapid, and on the whole he seemed uncomfortable. The rapid respirations led to daily examinations of the chest.

The right side gave normal physical signs, but on the left a change was noted. From the seventh rib down, posteriorly, there was dulness, loss of breath sounds and tactile fremitus. The voice was easily transmitted, and the fact that this was present made the condition puzzling.

Knowing that a needle puncture would do no harm, the side was aspirated, and a pint of serous straw-colored fluid was obtained. It was heavily loaded with albumin; Sp. Gr. 1016.

June 4. The immediate effect of this tapping was not helpful. The general condition remained the same. After another examination of the chest, tapping was again performed without result.

His condition became so alarming that inhalations of oxygen were used.

June 7. Patient seemed more comfortable, but the temperature still remained high. Other means were sought for this condition. and an abscess from the hypodermic injections and one from the hypodermoclysis puncture were found. After these were opened the temperature went still higher.

Some doubts now existed as to whether we were still dealing with typhoid fever or a septicemic condition. Suspecting an empyema, the chest was aspirated a number of times, but without result.

A remarkable feature was the occurrence of polyuria during the course of the disease and especially when the temperature was highest.

The urine in the beginning contained no albumin, but later showed a trace.

Constipation was now the rule, and great difficulty was experienced in obtaining daily bowel movements.

June 17. The temperature showed a tendency to come down, but during the next few days it again arose, causing considerable alarm.

His expression was anxious, breathing was rapid and labored; his condition resembled that prior to the first tapping.

Dr. Musser again saw the patient in consultation, and after a very careful examination of the left chest we decided that a pneumothorax existed.

The chest was hyperresonant, the coin test was positive, breath sounds were diminished and tactile fremitus was lessened.

The chest was aspirated, considerable air but no pus was obtained.

June 19. On this date the left side was aspirated again, and a large volume of gas was obtained, after which there was considerable improvement in his general condition.

In a review of this case there are many points that come up for discussion.

For over two months he was practically unconscious of his surroundings.*

The fact that the patient was unable to help us in the diagnosis of various complications that arose made matters very difficult.

The existence of the Hippocratic facies about twelve hours before the supposed perforation was very interesting. This fact is mentioned in the literature, and seems to be an important premonitory sign.

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* He did not remember his nurses, of which there were 5. One of these contracted typhoid fever and recovered. Another developed appendicitis and died from peritonitis after operation. His wife also contracted typhoid fever and recovered.

Our case is also interesting on account of the temperature remaining high during the supposed climax. This is not uncommon, and is mentioned by various observers.

The symptoms of appendicitis and perforation cannot at times be separated.

Deaver says: "To differentiate between perforative appendicitis and perforated typhoid fever is usually difficult and at times even impossible."

Keen also mentions the fact that a differential diagnosis is especially hard when stupor exists.

Beckett states in cases of great stupor pain may be overlooked.

In the light of modern views there is no doubt in the minds of the profession that operation is productive of the best results in appendicitis of all types. The same is true of perforated typhoid ulcer.

The question of the time of operation is important. Should we operate during shock or wait until the patient has sufficiently recovered to justify such a procedure?

We should not wait longer than is necessary to make the required preparations, which means usually a few hours.

Even at the end of this time, if shock still exists, the patient should be given the benefit of an operation. The first twelve hours are recognized as the preferable ones.

Operation should be done in all cases unless moribund.

Another interesting phenomenon was the presence of polyuria. While the temperature was at its highest large quantities of urine were passed ranging from 4,000 to 9,000 cc. in twenty-four hours; the average daily excretion was 5,000 cc. during his entire sickness. A large amount of urine was also passed during his convalescence.

All agree that polyuria is a sign of convalescence; in fact a defervescence in the fever can be foretold by an increase in the amount or urine.

Arnold says the quantity of urine is almost always diminished and of high specific gravity in typhoid fever.

Osler states that an increase in the amount of urine is not uncommon and that it may reach as high as 10,000 cc. and more in twenty-four hours.

Fussell reports a case of polyuria in typhoid fever in which during the height of the fever there was passed as high as 7,200 cc. of urine.

A few words may be said concerning the constitutional treatment. It varied with the remissions in temperature.

Stimulation was resorted to with utmost vigor. For many days the patient was taking strychnin sulphate 1-10 grain, tincture of digitalis xx. minims, adrenalin chlorid xv. minims, every two hours hypodermically; whiskey one and one-half ounces, every two hours by mouth.

In addition the patient took an average of three quarts of milk, six eggs and one quart of albumin water in twenty-four hours.

In conclusion I wish to extend my appreciation and thanks to Drs. Musser, Teller and Eshner, and especially to Dr. Teller for his valuable assistance during the entire sickness.

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DISCUSSION.

DR. L. J. HAMMOND: This instructive case illustrates a fact that is now generally admitted, namely, that appendicitis occurring in the course of typhoid fever is entirely coincident and in no way due to the typhoid process. On the other hand, it is a well known fact that the majority of cases of appendicitis that do occur during the course of typhoid fever are recurrent attacks. Preexisting disease in the appendix with the presence of many adhesions will lead to a recurrent attack, during the course of the typhoid. We should, therefore, keep in mind the fact that in the early stage of the disease, such symptoms as pain, tenderness and rigidity are not referable to the right iliac fossa. In such a case, one should suspect the presence of extensive adhesions and if the symptoms are severe immediate operation is justified, such an operation ought to lessen the liability to perforation.

DR. W. H. TELLER: I think the condition in the patient whose case has just been reported was that of preperforative typhoid with involvement of the peritoneal covering of the appendix by extension. I do not think it was a pure case of appendicitis or that it started as such. In many cases of typhoid fever there is involvement of the mucous membrane of the appendix exactly like the involvement of the patches in the intestine. The inauguration of the symptoms in this man was entirely due to preperforative typhoid and not due to appendicitis. On opening the abdominal cavity extensive adhesions were found around the bowel above the appendix which extended to the appendix and involved it.

DR. J. ALLISON SCOTT: It should be recognized that there are several varieties of inflammation of the appendix in typhoid fever. I have recently reviewed the literature of the last 12 months regarding perforation of the bowel and find that the figures in regard to the localization of the site of perforation are very instructive. Collecting statistics of some of the hospitals of London and its suburbs and of the Pennsylvania Hospital I have found in 9,713 cases of typhoid fever, 382 cases of perforation, 17 of which were in the appendix alone, due to ulceration from within: a percentage of 4.4. These were, therefore, perforation of the bowel due to typhoid fever, and not due to the ordinary cause of appendicitis. In the cases I have gone over there are cases of another type in which during the course of typhoid fever or during convalescence, acute inflammation of the appendix has been set up, but apparently of a different type entirely, not due to ulceration within the appendix. In an analysis of 60 cases that I have been studying recently at the Pennsylvania Hospital, there were 8 cases of disease of the appendix. Sixteen per cent. of the cases of what were supposed to be perforative conditions were diseases of the appendix. Five were distinctly due to typhoid ulcerative conditions within the appendix itself. Three were cases of pure appendicitis during the disease and practically what might be called post-typhoid appendicitis. The symptoms of appendicitis are distinctly different from those of perforation of the bowel. In cases in which the appendix alone has been involved in the nontyphoid type, the symptoms have been first an acute attack of pain and then for several days a more or less complete subsidence of the symptoms; then a sudden secondary attack of pain, and many of the ordinary symptoms of perforation. Therefore, I think that if cases of perforation of the bowel are studied carefully we shall find that the appendix is involved very much more frequently than we think. When operating upon supposed perforative cases the surgeon should examine carefully the lower 12 inches of the gut and if perforation is not found, he should examine the appendix and the upper portion of the ileum; then the large bowel.

DR. ASTLEY P. C. ASHHURST: There can, I think, be no question that there are several varieties of appendiceal inflammation during typhoid fever, but that we can distinguish these by the different symptoms or even by postmortem examination I do not consider possible. In the early stages of typhoid fever we may have sudden pain, vomiting and a certain amount of shock with rigidity over the appendix. If these cases are operated upon we will find an infiltration of the appendix, or an "appendicitis." It is probable that these are only typhoid lesions in the appendix. Later on somewhat similar symptoms may occur from perforation or ordinary inflammation of the appendix. The inflammation will so obscure the typhoid lesions that I do not see how it is possible to distinguish an inflammatory perforation from one the result of typhoid ulceration. Dr. Scott said he had collected a large number of these cases. I have references to about 82 cases of lesions of the appendix during typhoid fever. Twenty-seven were operated upon, and the mortality in the different stages of the disease is of interest. The case reported to-night was, I think, operated on in the third or fourth week of the disease. Of these twenty-seven cases, 17 recovered and 10 died, a deathrate of 37%. The mortality of celiotomy for intestinal perforation in typhoid fever as a whole is 74.03%. In the appendicitis cases, or those of lesion of the appendix, we find a mortality from operation in the first week of nothing at all; in the second week 50%; in the third week 75%; the fourth week 100%; in the fifth week, when the patient may be considered to have partially recovered his strength, the mortality is 50%; and during convalescence there is no mortality whatever. So I think that Dr. Behrend is to be congratulated upon having pulled through a patient at the most serious stage of the disease with such a serious complication

Dr. Behrend: I feel that I must take exception to what Dr. Teller has said. I do not consider this a case of preperforative typhoid, but one of pure appendicitis, which I grant was due to the extension of the inflammation as a result of typhoid. There is great difficulty, according to all authors, in diagnosing perforation from appendicitis. Everybody is of one opinion on that point. With the condition present in our patient, practically unconscious, it was doubly difficult to make a differential diagnosis.

The Relation of the Physician to the Bureau of Health.

By S. W. Newmayer, M. D.

[Read October 26.]

This is an age in medicine of sanitation and preventive medicine. The treatment of disease is secondary to the prevention of it. The profession has spent centuries to find the causes of diseases; and now, by evolution, we are advanced in the study of public hygiene. But it remains for us to give the practical application of the results of much labor, and prove to the world that our theories are right. The physicians' standing in the community is judged mainly by their ability to combat the diseases that may affect the masses. These are mainly the infections. The government and the people realize the need of the advice and protection from such diseases, by the physician. This authoritative guidance in sanitation and forensic legislation, you have vested in specialists in public health, who are grouped as a most important part of every municipal government, under the title of "Bureau of Health." The profession from all over the world has labored hard to give this bureau the ideas and knowledge from which it must work. But many forget that the practical application of the principles of sanitation lacks completeness without the unrelenting cooperation of the entire medical profession.

Cooperation is the word, in which are gathered all of the duties of a physician to the Bureau of Health. An explanation of this is the object of this paper. We are not so much in need of new discoveries for the eradication of communicable diseases, but those methods which are well known to be reasonably sure defences against the spread of contagion should be more rigidly and systematically practiced.

Medical inspection by the Bureau of Health, to within a recent period has been routine and along certain old and well-defined lines. Progress was slow because of limited laws governing their power, and a false conception of the ethics due the profession. The medical practitioner has been in greater part responsible for this state of affairs, because of his disinterest in municipal work, and also an ill-founded disrespect for health officers. In like manner the physician breeds a similar opposition against the Bureau in the families with which he comes in contact.

Irrespective of the relation of a physician to this branch of a municipality, through a set of laws laid down, he owes it a greater duty in promoting the unwritten laws of public health. We naturally expect a higher grade of morality in the profession of medicine than in other professions. To criticise the practitioner who fails to report a case of contagious disease, either for remuneration, or to so-called "protect or shield the family," would only be calling attention to the dishonest and disloyal members of the profession.

The health department has no desire to inconvenience a family who has a case of infection, only to see that proper steps are taken to the protection of the rest of the family and the community. There should be no need of legally calling some doctors to account for failure to report a case of contagion, so as to set an example to other physicians. To wait for the patient to be well advanced in the disease, permits of inestimable damage.

The maintenance by the city of modern, efficiently-equipped laboratories for bacteriologic and chemic diagnosis, free of expense to all who desire to take advantage, makes it inexcusable in most cases for long delay in diagnosis. Typhoid fever, malarial fever, tuberculosis, pneumonia and diphtheria are ofttimes diagnosed with ease, with the aid of the laboratory, when otherwise the diagnosis would be in doubt and possibly valuable time lost. This means of diagnostic precision is offered to you free. The work of this laboratory should materially increase, and yet the number of examinations of cultures made from suspected diphtheria has diminished in the last several years, though there has been an increase in diphtheria. The examination of the blood in suspected typhoid fever, for the Widal reaction, seems to be the one most desired by the profession. The value of this test may be better appreciated besides the quality of work by the city laboratory, when one notes that the number of blood examinations for this reaction since 1897 was 24,588, and the discrepancy between the laboratory and the clinical diagnoses was only 4.9 per cent.

Not only would I make a plea for more accurate and earlier diagnosis by the use of the laboratory methods; but a post-graduate course in the clinical diagnosis of the more common communicable diseases should be offered to physicians. The Bureau of Health should have under its supervision a series of lectures and demonstrations by competent teachers, which the physicians should be invited to attend. This would favor a more accurate and earlier diagnosis and fewer mistakes, and thereby lessen the spread of contagion. It may surprise one to know the large number of mistakes in diagnosis in the infectious diseases. To within a recent period there was little attempt to train the student of medicine in the practical recognition of these diseases. It is surprising that so little concern was given to this subject by medical colleges, when an error of diagnosis may affect a whole community, while in the ordinary noncontagious diseases it affects an individual. At the present time it is optional in all the five medical schools of Philadelphia for the students to study the infectious diseases. And Dr. Welch informs me that the number of students who attend the course at the Municipal Hospital numbers about one-third of the classes. The remedy of this would seem to be of no small importance. It should be compulsory for every medical student of all colleges to attend lectures on the contagious diseases, and see cases in the city hospital. Also there should be given to each graduating class one or more lectures on the duties of a physician to the Bureau of Health, explaining what diseases to report, and the best methods of protecting the public.

On the diagnosing of a contagious disease several things in reference to the family and the surroundings should be taken into consideration, in deciding whether or not to treat the patient at home. The neighborhood being a congested district; the dwelling being unsuitable for proper isolation; or small dependence being placed on the family being able to carry out strict instructions, to safeguard the public. Such cases should be encouraged by the physician in attendance to be treated in the city hospital. It is fortunate that there is no longer a choice as to the keeping of cases of smallpox at home. And the greatest boon to the prevention of the spread of contagions, will come when all cases of contagious disease will be required to enter a hospital for their treatment. With the completion of the new Municipal Hospital there will be an institution which will be unequaled by any similar one in the country. It is to be modern, comfortable, and well equipped for the treating of all contagions. The establishing of private rooms for those able and desirous of paying, and wards and service which will be inviting to both rich and poor, should make it impossible for the best home treatment to surpass it. With the opening of such an institution the profession should give unstinted aid in overcoming all prejudice against a hospital for contagious diseases. When patients insist upon remaining at home the attending physician should work in conjunction with the Health Bureau, to see that every precaution is taken to prevent the further spread of the disease. The case should always be isolated on the top floor, in a suitable room, away from the rest of the family. It is not unusual for the medical inspector to find a case in the parlor or the dining room, and the rest of the family going in and out of the same room, no attempt at isolation being made. The health department desires at no time to interefere with the instructions of a physician to a family; but if he entirely ignores instruction in the necessary precautions, it becomes the duty of the medical inspector. It is in these cases that the inspector is misjudged as interfering with the rights of the attending physician.

While many physicians in the most careful and conscientious manner instruct the families of patients with scarlet fever and diphtheria, yet they pay little or no attention to their cases of typhoid fever. A physician is not doing his duty either to his patient or the community, when he merely diagnoses and medicinally treats a case of typhoid. To him belongs the work of aiding the Bureau of Health in finding the possible source of infection and in carrying out the sanitary laws laid down by that department. If the attending physician would request the family to give the medical inspector all the necessary information, the department would never receive such replies as "You must see my lawyer," "I have no time," or a positive refusal to answer all questions.

To blame the water supply for the epidemics of typhoid fever in Philadelphia and elsewhere, and then sitting idly down and waiting for a pure stream to flow our way, is going wide of the mark. A study of the following statistics may prove interesting:

For the year 1903, the number of cases of typhoid fever in the twenty-eighth, twenty-ninth and thirty-second wards was 1,243. This includes that residential portion of the city west of Broad street and between Poplar street and Lehigh avenue. The majority of the residents of this district are of an educated class who are most apt to use spring, filtered or boiled water. While in the second, third, fourth, fifth and sixth wards, there were for the same period but 662 cases. This district has about an equal population, and extends east of Broad street, and from Wharton to Vine streets. It comprises what is considered the tenement or poor district, and mainly a class of people who scarcely know the meaning of filtered, spring or boiled water. But the reason I advance for this seeming paradoxical state of affairs is that the downtown section has the majority of its cases of typhoid fever removed to hospitals, and here they are no longer sources of infection. Few cases remain to beget other cases.

If the city spends $50,000,000 additional to the sum already expended for filtration, and also places in every home a copper filter, we would not be preventing typhoid fever. I do not mean to belittle the absolute necessity of a pure water supply, nor do I desire to dispute the value of copper as an antiseptic. But we must not forget that one case of typhoid fever is the cause of other cases directly or indirectly. The public has been allowed by many physicians to lapse into a careless attention of the prophylaxis of its cases of this infection. To prevent one case from infecting others, we must diagnose the case early and destroy the bacilli from all possible sources. The diagnosis of typhoid is uncertain in the early stages, but is more positive by the aid of the Widal test. In all continued fevers the laboratory should be used as soon as possible. But the physician should not wait in these cases for a positive diagnosis, but in all continued fevers he should take immediate precautions to disinfect the stools and the urine. There is nothing to be lost by such a procedure; but much is to be gained. The physician must impress the family with the great danger of infection and should insist on a thorough disinfection of all excreta, and a rigid carefulness on the part of attendants to disinfect their hands, etc. It is common for a medical inspector to meet a family having a case of typhoid at home for one, two or three weeks, and no instructions as to disinfection having been given by the attending physician. The inspectors' instructions in these cases rarely attain the results which would have been had the physician given proper advice and directions. Again, by the time the bureau has been notified much damage has been done.

It is not the object of this paper to detail the best methods of disinfection of stools, urine, expectoration, bed linen, attendants' hands and bath water. I venture to say, however, that a careful attention to the details in the disinfection in all cases of typhoid fever, would see this city almost free of the dreaded infection in less than three months.

The physician plays no small part in the responsibility to rid the city of smallpox. Every physician agrees on the absolute necessity of vaccination. The inspectors of the Bureau of Health have several times covered the entire city, in a house-to-house canvass to vaccinate all who would submit. But many children remain unvaccinated, and many adults have not been done since childhood. There are many of these who slam the door on the medical inspector, who would graciously submit at the mere suggestion of the attending physician. In the recent canvass during July and August, there were found 2,705 infants under two years of age, among whom only 790 were vaccinated. Think of it! 1,915 out of 2,705, or about 71 per cent, remain unvaccinated. From personal observation I know the greater number of these are due to the neglect of the family physician. He is the family advisor; his word is invariably their law; and because of his disinterest, many ignorant men and innocent children are allowed to face unprotected the danger of smallpox. An inspector finds a child five years old unvaccinated, implores the mother to have it done, and she answers, "I have my family doctor, thank you." Five years the child has faced the danger, and the doctor passes in and out of the home unconcerned, and he would possibly leave many more years pass if entrance to school did not force the issue. There is no shirking of work or responsibility on the part of health officials. It is a credit not only to the Bureau, but to the entire profession, to stamp out such contagion. To do this your aid is needed. Do not answer, "We are not paid for that work." There is much unpaid work in the profession and less profitable. The reward will eventually come to the entire profession.

The contagious diseases which carry off the vast majority of the human race, are those which can be greatly restricted in severity and numbers, but over which the health department has at present comparatively small control. Among this deadly list are tuberculosis, and pneumonia, and infant deaths from summer diarrhea. For the year 1903, the number of deaths in Philadelphia, from diseases of the lungs, phthisis, pneumonia, inflammation and congestion, was 6,333, or more than 24 per cent of the entire mortality rate for the year; while the deaths from diphtheria, membranous croup, scarlet fever, typhoid and smallpox combined, were 2,029, or less than 8 per cent. This does not include the deaths from tuberculosis in other organs of the body, and which we know ofttimes means primary or secondary infection of the lungs. So if the statistics were corrected for this factor, we would be horrified at the statement. Now that tuberculosis and pneumonia are reportable diseases in Philadelphia, the question arises, will we thereby lessen to a great extent this appalling condition? It is absolutely necessary to first locate the cases before steps towards restrictive and preventive measures can be taken. Placarding of the house is not desired and is useless. And any inconvenience to the patient is always avoided. The knowledge by the Bureau of Health of the presence of a case of tuberculosis is not the means of giving the least publicity to the case. The Bureau may distribute literature, and even give personal instructions in the proper sanitary precautions. This must have a great tendency toward limiting the further spread of this dreaded disease, but the work lacks a pillar of strength, without the conscientious cooperation of the entire medical profession. There must be a practical and concerted plan of education. Every physician sparing a little of his time, education and influence as a teacher; the subject, sanitation and domestic hygiene; and every dwelling in which he is called in his daily work—a school. This would have an untold influence, one which could never be attained by the combined work of the Legislature and Bureau of Health.

The Bureau of Health has done much toward preventing the spread of contagious diseases, and accomplished much good otherwise, by the establishing of the present medical inspection of the public schools. The school children have always been considered a great factor in the spread of contagion. The school-room is the place to teach, and there could be no more profitable subject taught the children than "How to live when well or sick." While physiology is taught in the schools, it would be well for those physicians who have in their hands the revision of school text-books, the addition to such books, of plain simple talks on contagious diseases, cleanliness and a favorable description of hospital life, that may help allay the fears of a child for such an institution. Added to the text-books, the children could be given occasional talks on subjects pertaining to their health and manner of living. A practical plan of accomplishing this has been successfully worked in one of the schools in the southern section of the city. What is termed "Parents' Meeting" is given by the principal and teachers of the school. At these meetings, which are of a social nature and held several times a year, the parents and their children are invited to attend. They are addressed by the principal or one of the teachers, and also by the medical inspector of the school on some subject relating to the care of their children. These meetings have accomplished much good. The parents are brought in closer contact with the teachers and the medical inspector, so when any instructions are sent home with the children they receive more and better attention.

To lessen the infant mortality rate is a subject that has long baffled the profession, and yet all agree that impure milk and improper food is one of the chief causes of this high death rate. Though numerous dealers are convicted of selling impure milk or preserving it with dangerous drugs, yet the crime continues. Not only should the physician and the trained nurse become acquainted with some simple methods for testing for impurities in milk, but the public should be educated along such lines, if necessary, by a corps of trained district nurses. This would give an opportunity to catch the culprits before the harm is done.

Among the by-laws of the county and state medical societies are found as part of the main objects, the following words: "And to the enlightenment and direction of public opinion, in regard to the great problems of state medicine, so that the profession shall become the more capable and more useful to the public in the prevention and cure of disease, and in prolonging and adding comfort to life."

With the conscientious fulfillment of such duties by every physician, I firmly believe all communicable diseases would be greatly ameliorated in severity and some would be entirely stamped out.

DISCUSSION.

DR. EDWARD MARTIN: There is much to discuss from the standpoint of the good of the public in Dr. Newmayer's paper, but the hour is late, and perhaps the best I can do is to tell you what the feeling of what might be called the executive of the city, as far as health is concerned, is to-day. The wish is to help you in your professional work, and not hinder; to strengthen you, and not weaken you; to act as your agents, and not as a foreign and independent agent. We ask your help, and we want to give you ours. We ask your criticism. We are anxious to secure your confidence. We have a corps of men who have been especially trained in this work. There is not a man in it who has not been a hospital resident, not a man who has not had a special course in contagious diseases, and who has not in other directions been fitted for the work. You cannot teach all men tact and judgment. You can make many wise, but you cannot make all men sensible. The underlying spirit of every man of the corps is to help you and to stand by you. If they do fail, it is not from indifference or lack of effort. With your full cooperation we can do all that a city health department should.

DR. RANDOLPH FARIES: There are a great many cases of contagious diseases never reported for the reason that the families are too poor to employ a physician. We usually come across them by accident. When we find numerous cases of contagious disease in which there has been no physician in attendance, what are we going to do? This is a question of vital importance to the city of Philadelphia, and how to overcome it is a very great problem.

DR. KATE W. BALDWIN: If some one will tell us how to reach the class of cases just spoken of I would be grateful. A great many of these appear at our dispensaries and sometimes it is almost impossible to get tubes to make cultures there and we cannot watch the patients. We tell them to send for their family physicians, and often they have none. Following these cases up we frequently find them in 2 or 3 days playing with other children in the alleys, no attention having been paid to our instructions. Of a number of cases of membranous rhinitis 2 or 3 were in very bad condition at the time seen; they were reported to the Board of Health for inspection. We sent to the nearest police station one day for tubes and they had no tubes but sent our messenger some distance away and there they had but 2 tubes. What became of some of these cases I do not know. In one case the children were allowed to remain in school because there was no attending physician. I saw a patient at the Polyclinic Hospital, in which a positive report had been received from the Bacteriological Laboratory; but which the assistant medical inspector thought was not diphtheria and referred to the family physician. In another case of diphtheria of the nasopharynx, in which bacteriologic examination was positive, the assistant medical inspector did not consider the diagnosis properly made. I should like to know whether the Board of Health would like to have these cases reported again, or just what we are to do to prevent the spread of contagion.

DR. J. MADISON TAYLOR: I would like to ask whether when one sends a culture to the laboratory and receives a positive report the physician is to understand that the Board of Health recognizes the facts and takes some supervision of the case; I have in mind dispensary cases. I have always felt that this was the case, and that having sent in the culture and placed the facts and address before the Board that I had in some sense discharged my duty.

DR. ANDREW A. CAIRNS: When a physician, in a case of true diphtheria, sends a culture to the laboratory of the Bureau of Health the report comes to my office marked "Plus" and instructions are then issued for the medical inspector of the district in which that patient lives to place that house under placard. The physician who sends the culture is also notified of the result of the examination. There is an Act of Assembly requiring him to report to our office all contagious diseases that come under his notice and blanks are sent from our office for this purpose at his request. He should fill this blank out also, but the house in which the patient is ill is placarded on the information sent from the laboratory. It is contrary to our methods for the assistant medical inspector to make any examination of the patient. The only examination we require is at the termination of the disease when he is to see all cases before he orders fumigation. If in his judgment the patient is not fully recovered fumigation is not to be ordered. If there are any mistakes made between our medical inspectors and the attending physician we will try to correct them at the earliest possible moment, if our attention is called to them.

Dr. Henry Beates, Jr.: I desire to speak to the subject of the paper, The Relation of the Medical Profession to the Bureau of Health." What it should be; what it is intended that it should be, and what it is, are subjects of interesting inquiry. What it is need not be defined; we all know it. The fact that the paper was read on this subject indicates what it should be. The Bureau of Health, in its commendable work, *intends* that the interests of this community, as jeopardized by infectious and pestilential diseases, and their spread, should be safeguarded by those means best known to the profession, that will offer reliable protection. Upon whom does it rest, however, to bring about cure, or to conduct a stricken citizen from pestilential disease to health, but the physician? Is not the physician the recognized bar of protection between the community and the diseases that decimate it? Is not he the sole reliance upon which the community rests for the cure of these conditions? Who is there upon whom these responsibilities more naturally rest, by common consent and right, than the qualified practitioner of medicine? Is he not legally authorized to discharge the functions of this great responsibility? Is he not believed to be qualified to so do? Does not humanity at large, by common consent, accord to the profession of medicine, this indisputable right, which, if qualified, it naturally merits? Is the Bureau of Health, by any power with which it can be invested, to usurp the rights of the physician? I am, unquestionably, in hearty sympathy with such administration of the Bureau of Health as has for its object the protection of this community from the spread of infectious and contagious diseases. With its intents and purposes, all qualified physicians must be in accord. But when the methods instituted by the Bureau of Health are carried out in detail, in such a manner, as experienced and trained physicians have found it to be, in dealing with these conditions, we must conclude that because of these, the very purposes of the Bureau of Health are defeated. At this point I desire to emphasize particularly the assertion about to be made, and which dare not be successfully contradicted. It is this, if the principles of the science of prophylactic medicine are an established fact, and underlie the action of the Bureau of Health in dealing with smallpox and other infectious diseases, certainly the application of those principles, by a qualified physician attending a stricken family, must achieve results far superior, when applied in the comfortable, cheerful and hygienic home, where there are means to secure these, as compared with the results of the same measures, applied under conditions of hospitalism. In the present state of development of the Municipal Hospital, it is utterly impossible to apply these prophylactic principles with the certainty of equally valuable results, as compared with home treatment. As things go in the Municipal Hospital, *not as they are intended to go*, let me repeat, but as they actually do, the place is utterly inadequate to successfully deal with an epidemic, or other infection. Recent experiences have shown that this assertion is not to be questioned. Take the method which existed a year or two ago of dealing with smallpox. Those individuals who were wise enough to remain in their own comfortable homes, where the disease had manifested itself, and who remained well because they were immune, when the stricken member recovered, were compelled by the Bureau of Health to be taken to the Municipal Hospital for an antiseptic bath. Since the organism of smallpox is unknown and its method of dissemination is unknown this seems illogical and absurd. Furthermore, an antiseptic bath could easily have been taken in the home of the individual, under the supervision of his physician, and so could the spread of measles, scarlet fever and diphtheria have been prevented. A personal experience may justly be narrated to show why a proper relation between the medical profession and the Bureau of Health does not exist. I reported a case of smallpox to the Bureau of Health a couple of years ago. I informed the family to send word to the male occupants of the dwelling not to return home, but to come to my office to be vaccinated. Five days later, these various men, pursuing their vocations as usual, having obtained board elsewhere, were hunted up by the Board of Health officials, and taken from their respective places of business in trolley-cars to the Municipal Hospital to be given this wonderful bath and to be revaccinated. I acquainted my friend, Dr. Abbott, with the episode, and it resulted in the doctors of the Municipal Hospital visiting me at my office. I may incidently remark, that the vaccinations took, but at the point of vaccination I had made, and not in those done by the doctors of the Municipal Hospital. I desire to further show what the relation of the physician is to the Board of Health and indicate why. A young physician, who has recently received his degree, and we know what practical training he has had in his undergraduate work; we have all been through it ourselves, is sent to the home of the patient reported by the physician. This now official of the Bureau of Health, demands entrance to the sick room, examines the patient, with a spoon forces open the mouth of the frightened child, in the presence of the excited and somewhat demoralized mother, comments upon the diagnosis, and questions as to the method of treatment. Is this the proper, courteous and ethical conduct of one professional brother to another? I have no doubt, that the assistant medical inspectors, selected with the care that they have been by the Bureau of Health, as a whole, are men of exceptional ability, but I certainly assert, without fear of contradiction, that they have not yet had the time necessary, nor the opportunity, of acquiring that degree of skill which can in any way be compared with that of the conscientious professional men, many years his senior. These methods of carrying out what the Bureau of Health intends to be done, certainly so inconveniences the people that the facts of the circumstances and existence of infectious diseases are *naturally covered up*. I know that doctors are endowed with no greater amount of moral principle and conscientiousness than the average human being, and the temptation is great to not report to the Bureau of Health, the existence of infectious diseases, when in their judgment the cases will make a recovery, and there is, consequently, little or no danger, of their failure to comply with the law being discovered. Indeed, the laity have been driven by these methods of the Bureau of Health, carried out as they are, not perhaps as they are intended to be, to recognize the same. My experience has driven me to instruct the families afflicted with infectious diseases not to permit an assistant medical inspector to examine the patient *unless he does so in my presence*. If we, together could devise some ethical means, by which the purposes of the Board of Health could be mutually carried out with certainty the proper relation of the Board of Health with the profession would be promptly established. There should be *no* delay in reporting contagious diseases. A competent physician, when first seeing the case, will *immediately* have the family conform with the requirements of the laws underlying the principles of prophylactic medicine; and he will do it more successfully, if anything, than the Board of Health can, because he is the attending physician and ever on the watch. Far be it from me to say anything derogatory to laboratory methods; but I submit that a clinical diagnosis is infinitely more valuable than a laboratory diagnosis. It should take precedence. I am glad that the discussion has developed the fact from Dr. Cairns, that the assistant medical inspector has no right to enter the house in which infectious disease exists, and examine a patient; that each inspector is supplied with printed rules setting forth this fact; that his function is merely to label the house in accordance with report of attending physician, and when the latter has reported to the Board of Health that the patient is well, *then*, and not until then, is the assistant medical inspector to enter the house and supervise the necessary fumigation and disinfection of bedding, etc., etc. I wish to add, that in spite of all the inconveniences attending the observance of the details connected with the intents and purposes of the Bureau of Health, in dealing with these cases, I trust it will not deter the profession from observing its duty, and that every doctor will promptly report his cases of infectious diseases to the Bureau of Health.

DR. CONRAD BERENS: I would like to recount one experience and make a brief comment on the same which I think has a direct bearing upon the subject. The Bureau of Health was notified of a case of diphtheria, and notified also in writing of the treatment instituted immediately, that precautions were taken and that the patient was absolutely isolated; also that the only person in contact with the patient was protected by antitoxin. After that patient had clinically recovered, two bacteriologic exminations having been made of the case on alternate days and both with negative results, the Board of Health was notified. It took them 5 days to send an inspector; in the meantime the yellow label remained on the house. The family had submitted to every demand made upon them for prophylaxsis. At the end of 5 days, an assistant medical inspector walks up, rings the bell and demands to see the patient. He steps in, pulls out a white gown, puts it on and demands a teaspoon. The patient is filled with fear and broken down nervously as a result of the disease, and this bull-headed creature comes in and jabs a spoon down her throat without even having washed his hands. He takes off his gown, walks out of the house and takes the label off. We have heard this elegant paper here this evening, and this is my comment, of which I could repeat a number of instances. This is a most grave question and one involving, first, the public health, which is more important than the professional income; second, that which is equally important, the liberty of the practitioner of medicine in this commonwealth. We have passed our examinations and are entitled to practice medicine without the interference of some outsider coming in to examine our patients. I feel that the statements made on behalf of the methods of the Board of Health (and this is said in an entirely friendly spirit), and upon the present attitude of the Board of Health of Philadelphia, are specious, and it appears to me to be but the entering wedge for a system of bureaucracy that will result in the supervision of the work of every practitioner by the Board of Health. The profession at large should take the most drastic measures to determine its *rights* as over against the *rules* of the Bureau of Health.

Dr. Andrew A. Cairns: I feel that I will have to take exception on this issue. There are only 2 diseases that the Board of Health requires the assistant medical inspector to make a diagnosis of: smallpox and chickenpox. A year ago las. July, at the solicitation of Dr. Martin, I spent one week with the New York Board of Health, and I had not been there 24 hours until I learned the secret of their success in avoiding error in diagnosis between smallpox and chickenpox. I told Dr. Martin my views and it was required that cases of chickenpox should be reported to our office. I am not prepared to state the number of cases of smallpox that have been reported as chickenpox. I think it is our duty to protect the community irrespective of the criticism which we receive. If an assistant medical inspector makes himself obnoxious it is not done under our orders. We instruct them not to criticize the attending physician, whether he be good, bad or indifferent.

Dr. Walter S. Cornell: As an assistant medical inspector I should like to say that the methods of disinfection of houses and of the giving of antitoxin at the hands of the Bureau of Health has not been touched upon. It is a matter of common experience that a patient with scarlet fever is sick for 5 or 6 days before the Board of Health gets any notice of it. There is not much delay between the time of the notification by the doctor and the notification of the medical inspector. In the 6 months in which I have been connected with the Bureau of Health I think I have never let a case which should be placarded go over night. In regard to the disinfection of the house, the inspector leaves a postal card with the family to be filled out by the physician that the house is ready for disinfection at a proper time. The physician is supposed to mail the card, and the inspector is supposed to go and make an inspection have the disinfection carried out the day after. I know of numerous instances in which the family has waited and the delay has been caused by the physician having carried the card around in his pocket for a week. The order of a medical inspector for antitoxin is equivalent to a rush order, and I think that as a rule the antitoxin is secured within 2 or 3 hours of the time it is asked for. In one instance in which there was none in stock at one of the stations it was obtained within an hour. Nothing could be better than that. As Dr. Cairns has said. in a case of scarlet fever or diphtheria we are not supposed to look at the patient I do not think it is any disrespect to my colleagues for me to say that if a man had any fault to find, it would be better to immediately see Dr. Cairns and state his case instead of taking an individual act and condemning a whole body of men.

Dr. R. H. Spangler: At one of my calls 1 examined 2 children who, in my judgment, had nasal diphtheria and advised that the family physician be called in. The next day, I found that the children had been sent to school with a note saying that the assistant medical inspector had made a grave mistake and that the children should be admitted at once. I sent the children home, went to the station house and secured tubes for cultures, and next day the bacteriologic report was positive in one, while the other did not show the presence of nasal diphtheria. These children had been in school and all the rest of the children exposed to the danger of infection.

Dr. I. Valentine Levi: I have found that the fact that the Board of Health carries out the disinfection, has been the source of a good deal of trouble between the assistant medical inspector and the doctor. The family physician will tell the family to burn some sulphur and that the Board of Health does not need to do anything further. This causes friction.

DR. S. S. COHEN: What is to be done with patients suspected of having diphtheria who come to dispensary or office? Are they to be sent to their homes in public or private conveyances or allowed to walk through the streets without disinfection? On the other hand, if there are no materials at hand for cultures and the throat is immediately disinfected with guaiacol, or formaldehyde or other equally useful application, a culture made shortly afterward will be negative. That is a problem which has come under my observation more than once. I wish Dr. Abbott could assure us that a simple swabbing, preservation of the swab and the submission of that to a prompt bacteriologic test would be sufficient in such cases. I refer of course to doubtful, not obvious cases. It is the doubtful cases in which the careless man will make a diagnosis of tonsillitis, from which the disease is most frequently spread. Personally, I feel it to be the duty of the physician, whether in his office or in the dispensary, to disinfect such a throat promptly when he has any doubt as to the character of the process. Concerning the relation of the Board of Health and its inspectors to the practicing physician, my own experience has been that as a rule there need be no trouble, if both sides are willing to act as human beings, who recognize their own liabilities to mistake, ought to be willing to act. Occasionally, an officious or tactless inspector has said or done something in a household to which I have been the physician to which I felt I could take reasonable objection. I have always found that communication with the superiors of this tactless or officious inspector has been the means of having him so instructed that he would not repeat the error elsewhere. That, I believe to be one of the factors in the relation between the physician and the Board of Health that each of us individually might well cultivate; to be prompt and unsparing in the direct report to the chiefs of the Bureau of Health of any dereliction or seeming offence on the part of the inspectors.

DR. JAY F. SCHAMBERG: I desire to reply to some of the statements made here this evening in criticism of the Department of Health and of the corps of assistant medical inspectors. In some of the utterances there has been but a measure of truth and much exaggeration. The task of safe guarding the health of the community is a gigantic and a difficult one; the Department of Health must see to it that all possible precautions are taken to prevent and stamp out infectious diseases. Dr. Martin has stated, that the coöperation of the entire profession is not only desired but necessary in this work, and that every effort would be made by the officers of the Bureau of Health to aid physicians. It cannot be gainsaid that there are some physicians who in their zeal to serve their patients do not perform their full and adequate duty to the community with respect to precautions in infectious diseases. Friction between assistant medical inspectors and family practitioners may in large part be avoided if each is tactful and courteous in his attitude toward the other. A frequent source of bitter feeling is the intentional or inadvertent distortion by patients of statements made by the one or the other physician. I desire to defend the corps of assistant medical inspectors against the charge of incompetency made here this evening; I speak advisedly for I have had a very considerable contact with the members of this corps. The assistant medical inspectors, as a class, are a conscientious and able body of medical practitioners; their average competency is above that of the general body of physicians in the community. Many of the members have graduated from their respective colleges with honors; a number of them have had splendid experience in contagious diseases as internes in the Municipal Hospital. All of the members of the corps have had special bedside instruction in the diseases with which they come in contact in their daily work. A very important phase of the medical inspector's work at the present time is school inspection. There are still imperfections in the system but these are gradually being eliminated and the efficiency of the work increased. The medical inspection of schools and school children is of the greatest importance to the city. A number of cases of scarlet fever, diphtheria, measles, mumps, whooping cough and numerous patients suffering from contagious eye and skin diseases have been excluded from the schools. The assistant medical inspectors are becoming more and more expert in the work which they are called upon to perform. I am quite sure that the medical profession has full confidence in the Director of the Department of Health, and in the Board of Health; you all know the personnel of the Board: Drs. Abbott, Penrose and Pearson.

DR. EDWARD MARTIN: We will welcome any suggestion that will make the department run in a business-like way. We want the help of the profession. If these cases had been reported to the central office they would have been run to the ground. If there is a better way to do the work we should be obliged to have it shown us.

DR. NEWMAYER: The Board of Health exists to prevent the spread of contagious diseases, to do that with the least delay, with the least amount of interference with any physician, and farther than that, with no interference with any physician's rights. We are guided in our work by acts of legislature, the wisdom of which we are not to question. Physicians who have the interests of their patients the interest of the public and that of the profession, in consideration, need no reminder that a department such as ours needs their aid and cooperation. The Bureau of Health of Philadelphia to-day is doing more and better work than ever before, and with the good-will and cooperation of the profession, it will rank as the best in the country.

Fibroma of the Uterus Complicated by Disorders of the Heart and Kidneys.

BY GEORGE ERETY SHOEMAKER, M. D.

[Read November 9.]

Fibroma of the uterus was formerly looked upon as a mass of unstriped muscular fiber, innocent in itself, likely to disappear at or near the menopause and only occasionally requiring interference because of excessive hemorrhage. Women were encouraged to wait for the menopause, under the impression that all trouble would then be over. Later observation and analysis of this very prevalent class of growths has shown that the simple uncomplicated, harmless fibroid tumor, while occasionally encountered is comparatively rare, if the past, present and future of the individual are considered. Various complications appear sooner or later which are attributable to the tumor or which are greatly aggravated by its presence. Among these may be mentioned salpingitis, peritonitis, intestinal obstruction, diseases of the bladder, primary or secondary anemia, profound depression of the nervous system from impairment of nutrition as the result of hemorrhage; diseases of the kidneys due to back pressure, or ascending diseases from the bladder, increased load upon the heart, giving rise to dilation. Investigation has shown that the heart muscle in the presence of fibroid tumor is liable to a special form of degeneration. Owing to the loss of blood all tissues are starved, including the heart muscle, and owing to the increase of load or to strain produced by the interference with peripheral circulation, *e. g.*, in the lower extremities and kidneys, the fibroid tumor may become a serious feature in impairing the efficiency of the heart. Dropsy of the lower extremities is quite common. It may be due to direct pressure upon pelvic vessels, or be secondary to heart weakness. From the standpoint of causation, cases may be divided into those in which heart and kidney degeneration or interference are due to the tumor. Second, those in which the heart and kidney lesions exist from other causes and in which the tumor exhausts the vital forces and increases the burden.

From the standpoint of the conscientious surgeon whose advice is sought, the questions of management group themselves in two classes of cases. *First,* the relatively early ones, with a tumor possibly as large as a child's head, in which the hemorrhage is still within the capacity of the endurance of the individual and the secondary complications have not appeared. The discussion of whether or not to remove such a growth, while yet the danger of operation is small (not over 2 per cent.), is one which depends upon many individual factors and much time would be required to formulate rules. In general it may be said that a growing tumor, causing trouble, in any of the many channels of interference with vitality, had better be removed. A few cases may be kept under observation when pregnancy is desirable and not likely to be fatal, or in which small tumors are quiescent in single women. *Second,* the other group consists of those in which serious disease of other organs exists at the time of first observation. Here the nicest consideration must be given to general problems, and also to the effect of anesthesia and shock upon a system already weakened by lesions of lungs, heart, kidneys or liver.

Without attempting to enter exhaustively into this discussion, it may be said that cases having serious visceral lesions may be operated upon with advantage if the presence of the tumor seriously exhausts the vitality or complicates the situation, as by prolonged hemorrhage or pressure; especially if there are adhesions of the intestines or chronic sepsis, provided that intelligent study indicates a reasonable margin of safety. Such operations, if undertaken, must be preceded by a careful preparation of the individual. Rest in bed, selected simple nutritious food, saline laxatives, high retained enemas of salt solution, bathing, the administration of digitalis, waiting for control of hemorrhage temporarily are measures which may be indicated. The avoidance during operation of exposure, bowel handling and loss of temperature is important. It is remarkable how favorably such patients may be influenced by operation thus intelligently undertaken.

The following case illustrates the management of a serious heart lesion associated with a tumor of the uterus, which is growing steadily worse and which from increase of size, attacks of peritonitis and from hemorrhage is sure to cause, directly or indirectly, the death of the patient if not removed:

Mrs. B., aged 39 years, was referred to the writer's service at the Presbyterian Hospital by Dr. John H. Service. She had been married 13 years, but had been absolutely sterile Had never been very strong and was subject to colds. Had 3 separate attacks of rheumatism in the last 20 years, which had left their impress upon her heart. Her menstrual periods had been increased in quantity and duration for about 8 years. The flow gradually became quite profuse and recently has appeared more or less all through the month. For the first five days of her periods, she uses 12 napkins per day. The patient is quite anemic and has dyspnea on exertion. The lungs, liver, spleen and kidneys are negative. The apex beat is in the 5th interspace, rather forcible and diffuse. Displaced outward to the nipple line. A soft blowing systolic murmur is heard at the pulmonary cartilage, at the apex and in the axilla. A slight thrill over the apex. Distinct pulsation of the neck. Old pericardial friction sound. Diagnosis: double mitral murmur with imperfect compensation, old pericarditis. A hard fibroma of the uterus, size of 5 months' pregnancy, occupies the lower abdomen. It has several nodules and is not movable, being intraligamentary on both sides. As the patient had no chance without operation, though the risks were increased by the heart condition, hysterectomy was advised. The operation proved difficult because the tumor was covered by universal adhesions. The bladder was drawn half way to the navel, neither broad ligament could be identified. After removal of the tumor and amputation of the uterus at the cervix, some trouble was encountered in controlling oozing from the extensive raw surfaces. On the eighth day there was pain and redness in the left wrist and elbow, with an increase of temperature. There were no further abdominal symptoms, but a typical attack of rheumatism of the arms and shoulders developed. There was some increase in the pericarditis, and pleurisy with some effusion developed in the left chest. The abdominal wound healed aseptically, and though the patient had considerable dyspnea, she slowly recovered from the chest complications, while the rheumatism of the arms slowly disappeared. Dr. R. G. Curtin kindly saw her in consultation during the rheumatic attack and found no evidence of an acute element in the heart lesion. In 5 weeks the patient could sit up and was entirely free from chest pains, with a good appetite and constantly increasing strength. The heart murmur was then practically the same as before the operation, the lung entirely cleared up. The expectation of life of this patient is enormously increased by the final removal of her hemorrhage and the focus for attacks of peritonitis, as well as distortion of the bladder and ureters. As far as the heart is concerned, she stood the strain of operation well. Had the complications rising from acute rheumatic conditions been absent her convalescence would have been almost uneventful.

The following case illustrates a normal recovery after hysterectomy, though the heart had a definite murmur and there was arteriosclerosis:

Mrs. Y., sent by Dr. Fithian, 2 births, 1 miscarriage; suffers from increase of flow, pain in the sacral region and in defecation, increasing for 3 years. Some swelling in the ankles and dyspnea. Pain in back steadily worse, loss of strength and weight in last year. The heart beat is rather diffuse, fifth interspace midclavicular, harsh systolic murmur, loud at apex, heard faintly in axilla. Second sound accentuated. Arteries rather hard, pulse full, high tension. Veins of neck pulsate. Slight pretibial edema. She had a large uterus containing several fibroid growths firmly adherent posteriorly. It was removed by abdominal hysterectomy, the patient withstanding the operation unusually well and making a comfortable and aseptic recovery. The pulse remained constantly below 88.

The favorable result in this case was due to very little exposure or handling of the intestines, to rapid operating, and a determined effort to protect the patient from exposure during the operation and to maintain her temperature. There was very little loss of blood. Such a patient would stand the shock of the operation poorly.

Another case illustrates the action of large fibroid tumors in producing uremia through partial mechanical obstruction of the ureters.

S. McD. had been a strong, hard-working woman, until about a year before she came under observation, as learned from her relatives. On admission to the Presbyterian Hospital there was found an enormous fibroid tumor of the uterus, extending from the region of the liver on the right side, deeply into the pelvic outlet. Her mental condition was dull and apathetic and no intelligent history could be obtained. There was high tension pulse, accentuated second sound of the heart and scanty urine, which however, showed no albumin and no casts. There was profuse hemorrhage from the uterus, profound anemia, a hemoglobin of 29%. The tongue was coated, constant headache, nausea and vomiting which with the hebetube and scant and irregular flow of urine led to the diagnosis of uremia. The urea percentage was 1.7 in a total of 14 ounces. The pulse was poor and the patient in no condition to withstand an operation or even anesthesia. She was removed to the medical ward under the care of Dr. R. G. Curtin, with the diagnosis of fibroid tumor of the uterus and uremia. Some hope was expressed that vigorous treatment directed to the uremic condition, might make it possible to operate at a later day. The urine varied greatly in amount, on some days being very scant and on others reaching a normal quantity. This was accounted for by pressure of the tumor upon the ureters, which had apparently produced a condition of inefficient kidneys without a definite nephritis. Mobility of the tumor, the lower end of which fitted tightly the bony pelvis like a ball valve, relieved the ureters in certain positions of the body. Under the administration of diuretics, milk diet and salt solution enemata, she slowly improved, the hemoglobin on one occasion was brought over 50%, but promptly dropped again from a new hemorrhage. The pulse became softer and it was finally decided that an attempt to remove the tumor was justifiable, as without operation her condition was hopeless from kidney interference and hemorrhage. After careful attention to detail of preparation the tumor was delivered through an abdominal incision, its blood supply tied off and the uterus amputated at the neck. The patient made a smooth, normal and aseptic recovery. Her mental condition improved, the hebetube disappeared entirely and when discharged from the hospital the anemia was being rapidly overcome. The kidneys resumed their functions after removal of the pressure, although the total amount of urine was not over 30 ounces per day.

The following case is an instance of giving way of the heart under the strain of excessive hemorrhage, when no organic disorder was demonstrable. There was no opportunity to examine the heart muscle microscopically as the patient did not die. There was, however, probable muscle degeneration.

Mrs. E., aged 44 years, sent by Dr. Good, a multipara had bled excessively for 2½ years from a fibroid tumor reaching nearly to the navel. She saturates 12 large diaper-like napkins per day, for 2 days, at the beginning of her period, after which the heart grows weak, the lips become ashy gray in color, there is shortness of breath and palpitation following slight exertion. She is at times seized by night or day with a sense of impending death. There is absolute self-control and no hysteria. The pulse becomes intermittent, dropping every third beat; hemoglobin 50%. Though this patient was obviously near the limit of her endurance and the death her friends feared from hemorrhage might have really occurred through heart failure, she was carefully prepared for operation for sveral days, the heart being brought under the influence of digitalis and the bleeding checked by temporary measures. The greatest care was taken in detail to avoid shock during the operation. Abdominal hysterectomy resulted in a very smooth recovery and the patient several months afterward reports herself absolutely free from discomfort and feeling better than for many years. The tumor was submucous.

DISCUSSION.

DR. JUDSON DALAND: The most important lesson taught by the report of these cases is that even in unselected cases, cases in which Dr. Shoemaker had no desire to operate and in which the conditions were such that operation was necessary in order to save life, no serious damage was done to the heart. Personally I have been surprised, in a number of instances, to find how well the subjects of pronounced heart disease have behaved under anesthesia and how well they have borne the shock of an abdominal operation. I am inclined to the opinion that the danger to the patient is, on the whole, probably less than we are inclined to think from our previous studies of cardiac cases in relation to operation.

DR. SHOEMAKER: I would say that the examination of the whole patient is exceedingly important in these cases, because we may otherwise overlook a very important condition. There is a patient now in the Presbyterian Hospital, sent in for hysterectomy, with a large tumor involving the uterus, in whom the routine examination revealed consolidation of the left chest. She gives a history of no serious acute illness. The condition was suggestive of a secondary sarcoma, with overlying effusion, but as it is subsiding it is probably pleurisy only and we are waiting until absorption takes place.

The Influence of Hunger and Hemorrhage on the Composition of the Blood Plasma.

BY THOMAS STOTESBURY GITHENS, M. D.

[Read November 9.]

Although it has been known for many years that the bloodplasma contained several proteids, the quantitative study of these bodies made little progress until the researches of Hofmeister and others developed the method known as salting-out.

This method is based on the fact that the addition of ammonium, magnesium or sodium sulphate to a solution of proteids, renders them insoluble, and that each proteid is precipitated at a definite concentration.

By this method it is possible to separate the proteid of the blood plasma into four distinct bodies; namely, fibrinogen, euglobulin, pseudoglobulin and serum albumin.

In my own work, the blood, drawn from the femoral artery into a solution of sodium oxalate in normal salt solution, was immediately centrifugated and the clear plasma thus obtained was used for the estimation of the bodies. Two series of experiments were performed, the object of both of which was to determine which of these bodies was nearest to the form in which proteid is assimilated.

Moll has shown that blood plasma, made slightly more alkaline and kept at a temperature of 56° C. (130° F.) for half an hour, shows an increase in the percentage of globulin and considers this evidence that serum albumin is first made from assimilated proteid and that this is later converted into the globulins.

In the first series I bled dogs freely, four or five times, at intervals of several days and examined the blood thus obtained. It showed always a rapid and steady decrease in the percentage of fibrinogen and a corresponding increase in the serum albumin, the relations of the globulins not being so definite. This change is best explained by the assumption that albumin stands nearest to the form in which proteid is absorbed and therefore is replaced quickly from the food, while fibrinogen, being more specialized, is more difficult to replace.

In the second series I starved dogs for two days and then kept them for long periods on half the usual diet, afterward feeding them freely again. During the period of hunger, these dogs showed a marked increase in the percentage of total globulin including fibrinogen, which generally affected all three bodies and a corresponding fall in the serum albumin. Similar results were obtained by Burckhardt, by Salviolli and by Lewinsky in dogs, and by Tiegel in snakes.

These results confirm the view that albumin stands nearest to the form in which proteid is absorbed, as does the fact that when my dogs were put on a full mixed diet, the percentage of albumin rose promptly to normal.

In conclusion I will say, that those who wish to see the details of my experiments will find them, with references to the literature, in Hofmeister's *Beiträge zur Chemischen Phys. and Path.*, 1904, Vol. V, page 515.

The Use of Methylene Blue in Malarial Fevers.

BY HORATIO C. WOOD, JR., M. D.

[Read November 9.]

Although the introduction of quinin into medicine has revolutionized the prognosis of malarial diseases, it can scarcely be considered an ideal remedy. Among its disadvantages may be mentioned its irritant action upon the kidneys which in some cases has seemed to entirely prohibit its use, the unpleasant by-symptoms caused by it, especially tinnitus aurium, and the not infrequent occurrence of idosyncrasies in patients in whom it may cause a variety of toxic manifestations. On account of these and other occasional objections to this drug, and in view of the fact that in certain forms of intermittent fever quinin seems almost without effect upon the course of the disease, a large number of remedies have from time to time been employed in the treatment of malarial conditions, some of which have shown themselves to be possessed of more or less feeble antiperiodic power. Nearly all of these remedies on further experience, however, have proven so vastly inferior to quinin that,with the exception of arsenic in certain types of malaria, cinchona for the majority of practitioners has remained their sole weapon against the miasm. In 1891 Ehrlich and Guttmann, led by the discovery of Celli and Guarnieri of the peculiar relations of the plasmodium malariæ to methylene blue as a staining agent, essayed its therapeutic use in two cases of intermittent fever. The results in these two cases proving favorable a number of other investigators have made similar trials until we are able to present the statistics of over 400 cases in which the drug has been used. Nevertheless, in this country at least, methylene blue has not received general recognition as an antiperiodic, and it has seemed, therefore, worth while to report the results which were obtained in seven cases at the Philadelphia General Hospital during the past summer and to compare them with those already published. These cases occurred on the services of Drs. David Riesman and T. Mellor Tyson, to both of whom I desire to express my thanks for the permission to report them. Of these seven, one was complicated with typhoid fever so that it was impossible to judge of the influence of the methylene blue. Of the six remaining cases three were quotidian and three tertian in type. In each case the diagnosis was confirmed by finding the malarial organism in the blood.

In all six cases there was a cessation of symptoms and disappearance of temperature as the result of the treatment, yet in four out of six cases there was at least one distinct rise of temperature after the commencement of the treatment, although in no case was this rise of temperature equal to that which had occurred previously to the administration of the drug. There was one case in which there was more than one paroxysm after the beginning of the treatment. This patient gave a history of chills and fever recurring every second day for one week before admission. The day after admission he had a paroxysm in which the temperature rose to 104°. The next day the patient was ordered methylene blue, two grains three times a day; following this the patient had at the regular time a mild paroxysm in which the temperature rose to 103°. The third day after at the regular time for the malarial attack the temperature rose to 100° but without any of the other symptoms of the paroxysm. The dose given in this case was very much less than that used in the other patients, the ordinary quantity employed being two or three grains every three hours.

None of the patients remained in the hospital for more than three weeks after the commencement of the treatment and it is, therefore, impossible to speak positively as to the permanency of the cure. In only one case was there, however, any return of the symptoms, and in this case the relapse yielded readily to renewed treatment.

Altogether the results have been extremely gratifying. Nevertheless, despite the uniformity of the results, it would be unwise to make any positive judgment from such a small number of cases but there have been reported by other writers a sufficient number of cases to render possible at least an approximate judgment as to the value of methylene blue in the treatment of malaria. A considerable number of authors have claimed to obtain very favorable results with the drug, but have not committed themselves to a definite numerical statement, but I have succeeded in collecting from the literature 425 cases reported in sufficient detail to be statistically useful.

Reporter	Number of Cases.	Attacks Stopped.	Relapses.	Final Cures.	
Ehrlich and Guttmann ..	2	2	0	2	
Ollwig	9	8	4	7	
Parenski and Blatteis....	35	34	1	33	
Grawitz	1	0	0	0	
Ziemann	3	0	0	0	
Cardamatis	275	..	18	257	
Ketli	5	5	5	0	
Moncorvo..............	36	..	..	10	Lack details.
Boinet	6	4	1	4	
Smithwick	47	43	1	43	Two failures died [in a few weeks.
Wood	6	6	1	6	
Total................	425	...	31	362	

Floeckinger says that he has used methylene blue in 600 cases[1], and places it in the same rank with quinin as an antiperiodic. Cardamatis who has reported the largest series of cases which I have been able to find in statistical form, regards it as distinctly superior to quinin. This opinion is confirmed by the experiments of Rosin who studied the action of solutions of quinin and of methylene blue upon the plasmodium malariæ on the stage of the microscope. Rosin found that with the method he employed a solution of quinin of 1 to 5000 was not able to arrest the ameboid movements of the plasmodium, but a solution of methylene blue in the proportion of 1 to 20,000 both killed and stained the parasite.

There have been some authors whose results have not been favorable. Grawitz used it in one case with failure which discouraged him from trying it again. Ziemann (quoted from Ollwig) employed it in three cases and states that it had no effect either upon the plasmodium or the course of the disease. Ketli employed it in five cases with suppression of the paroxysm but in every case there were subsequent relapses and he claims that the remedy cannot be regarded as curative. Despite these few unfavorable results, however, there seems little room for doubt that methylene blue deserves to rank as an antiperiodic, if not equal in power to quinin at least far superior to any other drug at present known.

Methylene blue does not produce, as a rule, the dramatic immediate cessation of the malarial paroxysm which is frequently seen with quinin. As I have already said in most of my cases there was after the commencement of the methylene blue treatment, at least one rise of temperature; but this rise was very decidedly less than the previous elevations and was unaccompanied by the ordinary subjective symptoms which have given to the disease its popular name of "chills and fever." In the 275 cases reported by Cardamatis in only 18 did the symptoms disappear immediately after the administration of the drug.

The observations of Iwanoff on the effect of methylene blue on the protozoan of malaria are very suggestive as to the cause of this difference in the action of methylene blue and quinin. As is well known, quinin in its toxic action upon the parasite of intermittent fever attacks principally the chromatin of the organism, and therefore the younger forms of the parasite are much more susceptible to its action than the adults. On the other hand, Iwanoff found that methylene blue affected chiefly the protoplasm and has practically no effect upon the chromatin elements, and the younger forms therefore escaped almost entirely, but the adult protozoa were much more easily killed by methylene blue than by quinin. For the same reasons the crescent form of the parasite, which contains but little chromatin and is notoriously very resistant to the action of quinin, is readily destroyed by methylene blue. If methylene blue kills off only the adult organisms it is evident that the younger generations may grow up in small numbers and produce a less severe form of paroxysm, but the constant destruction of the adults must lead in a few developmental cycles to the complete annihilation of the infection.

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[1] These could not be included in the table on account of absence of numerical details.

Particular interest relates to the value of methylene blue in those cases of malaria in which quinin is contraindicated, and of these by far the most important is hemoglobinuria. I have not had an opportunity of personally testing the action of methylene blue in hemoglobinuria, but that it is not irritating to the kidneys is clearly shown by one case. This patient was suffering from albuminuria at the time of his entrance to the hospital, and with partial suppression of the urine to such an extent that he was deemed on the verge of uremia and was treated with hot packs and diuretics. After he had reacted to the antinephritic treatment he was placed on methylene blue, three grains every three hours, which was continued for ten days without any aggravation of his renal symptoms, All those who have employed the remedy in blackwater fever are in accord in the statement that it never increases the hematuria, while many writers believe that methylene blue exercises a direct beneficial action upon the kidneys, apart from its antiperiodic properties. Among the cases reported by Ollwig was that of a man with a chronic malaria in whom quinin immediately caused hemoglobinuria, but under the use of methylene blue both the blood and albumin completely disappeared from the urine. In another case reported by the same author in which, as the result of repeated hemorrhages from the kidney, the hemoglobin content of the blood had fallen to 50 per cent; under methylene blue treatment there was prompt recovery and in the course of a few weeks a normal percentage of hemoglobin.

The mode of administration which I have employed has been simply to give the drug in doses of two or three grains every three hours for a period of a week to ten days and make the withdrawal a gradual one. After a careful consideration I am not at all convinced that this manner of exhibiting methylene blue is not as efficacious as the more elaborate plans which have been offered. One point I would emphasize and that is the continuance of the treatment over a period of several weeks. The failure to observe this precaution has been the cause of many of the relapses recorded.

A number of authors have reported as by-symptoms from methylene blue, vomiting, loss of appetite, stangury and symptoms of bladder irritation. These I have not observed in my own cases. Perenski and Blatteis assert that most of the unpleasant symptoms attributed to methylene blue are due to the use of the dye instead of the medicinal methylene blue. Medicinal methylene blue is a different substance from that used as a stain although closely related to it chemically. The medicinal methylene blue is the simple chlorid of tetramethylthionin, while the dye stuff is the double chlorid of zinc and tetramethylthionin. Moreover, the dye stuff contains various impurities of which arsenic is the most important. One drawback to methylene blue is its vigorous staining properties. Not only the urine presents a greenish or bright blue tint, but frequently the corners of the mouth and the fingers in handling the pill become stained, occasionally also the saliva is bluish. If the patient should vomit a mass of glaring blue material, unless he was forewarned it is easy to comprehend the alarm it might cause.

From this brief study I think the conclusion is justified that in methylene blue we have an antiperiodic which rivals quinin in power and which is in many cases to be preferred to that alkaloid on account of its freedom from unpleasant by-symptoms.

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DISCUSSION.

DR. H. E. WETHERILL: I would like to ask Dr. Wood whether the methylene blue stains the stools? While in the Philippines we were nearly out of quinin and used mackabohai. It has a bitter principle, and whether it does contain quinin I do not know, but am having it tested by Merck & Co. It had some beneficial effect. Is methylene blue much cheaper than quinin?

DR. THOMAS S. GITHENS: I would like to ask whether there is any objection to using the methylene blue and quinin together in cases in which quinin is not contraindicated? Would it be possible to get the effects of both drugs, or would there be any bad influence of one on the other?

DR. WILLIAM PICKETT: I think I can answer Dr. Wetherill's question. At Blockley the late Dr. Hughes employed methylene blue as a sedative and the stools were not colored. Also, I have a criticism of the treatment based upon that very sedative action. In doses of 3 grains every 3 hours, I should think the patients would be asleep most of the time. Are not the effects upon the heart decidedly depressant? Strangury has been troublesome in a number of cases that I have observed.

DR. WOOD: Answering Dr. Wetherill I would take it that methylene blue would not be found in the stools. It is eliminated only through the kidneys. Answering Dr. Githens, the combination of quinin an methylene blue has been recommended, I think, by Floeckinger. In reference to the sedative action of methylene blue, I can only say that all my patients, except for the first day, were around the hospital, and that none of them fell over asleep or with heart failure. I saw them every other day and did not observe any signs of depression of the brain whatsoever. The pulse charts were favorable and there was no sign of any change except the disappearance of the malarial paroxysm.

PROCEEDINGS

OF THE

Philadelphia County Medical Society.

Typhoid Fever in Philadelphia.

BY RANDOLPH FARIES, M. D.

[Read November 23.]

For many years Philadelphia has been considered a city in which typhoid fever exists in a much larger proportion than any city in the United States and, in fact, in the world. While one may possibly admit such to be the case, yet there are numerous facts which will prove that typhoid fever does not exist in Philadelphia in such alarming numbers as the general public is given to believe. For a long time the medical profession has known that numerous diseases are easily mistaken and incorrectly diagnosed as typhoid fever, especially in their early stages. With this knowledge and some other considerations it will readily be seen that the Bureau of Health frequently receives cases reported as typhoid fever, which a week or two later prove to be some other disease. Such is the case in a great many cases of pneumonia with typhoid symptoms, acute miliary tuberculosis with abdominal symptoms, ulcerative endocarditis, meningitis, septicopyemia, simple continued fever, abscess of the liver, typhus fever, empyema, æstivoatumnal malaria, appendicitis, influenza, cerebrospinal meningitis, catarrhal fever, described by Dr. Roland G. Curtin, and some other diseases. I have just enumerated thirteen diseases which may be mistaken for typhoid and may add that I know of one case of a simple bilious attack, one of variola, and several of ephemeral fever which were diagnosed typhoid fever; making sixteen in all. I believe every physician who suspects his patient is suffering with typhoid fever should be especially careful in diagnosing the case before he reports it to the Bureau of Health, and no case should be returned as typhoid fever unless a Widal reaction has been taken and in adition the urine, feces and catarrhal secretions examined. He should be especially careful in examining the liver and spleen and also note the course of the temperature and the nature of the pulse; the amount and kind of stupor, as well as the nervous symptoms when present. Especial pains should be taken when examining the abdomen and great stress laid upon the spots which should be lenticular, as described by Murchison, and he should also make a blood count in order to aid him in differentiating typhoid from other diseases before reporting the case to the Bureau of Health; by so doing few if any errors in diagnosis would occur. After consulting the records of the cases which came directly under my inspection, I found that in 28 per cent. of these cases the disease was contracted at some seaside resort or in other cities, and Philadelphia was thus credited with numerous cases which did not belong here. If every physician, when reporting such cases, would be careful to state whether the case originated in Philadelphia or elsewhere, I feel sure the percentage I have just quoted would be much larger and the true cases in Philadelphia much smaller. Referring to the diagnosis of typhoid fever, I would say that I have frequently gone to inspect houses as to their sanitary conditions, after a case of typhoid had been reported to the Bureau of Health, and have had a member of the family ask me what I came for. When I answered that I had been notified by the Bureau of Health to visit the house because there was a case of typhoid fever, I received the reply: Why, the patient is well and he has only been sick four or five days! I have also been told that he is not at home, having gone back to work. Further than this, Dr. A. A. Cairns, chief medical inspector of the Bureau, told me, not long ago, that in one week, the attending physician in one of our leading hospitals had, with his interne, by careful study and observation, revised the diagnosis of seven cases which had been reported to the Bureau of Health as typhoid fever. If all of our hospitals would return these cases after a correct diagnosis has been made and the list with the name and address of the patient given, the Bureau of Health could give an accurate statement of the true cases occurring in Philadelphia.

There is another condition which falsely increases the number of typhoids, per week, and this is the fact that a patient will remain at home for a period of time and then consent to go to one of our hospitals. In such cases the Bureau receives a second report of the case; the first coming from the family physician. This could easily be prevented by each resident physician, who has charge of these cases, being careful to ask the patient if his case had already been reported by the family physician, and if so, simply state it on his report and mark the report "duplicate," and this would be filed with the first report immediately by the Bureau of Health and not included in its weekly report. Having mentioned the diseases in which errors in diagnosis occur, I would say that I am not criticizing the profession in the least, because anyone is liable to err, and I heartily agree with my teacher, Professor William Osler, when he remarks that the symptoms laid down in the text-books do not coincide with those at the bedside, and he further adds, that it would puzzle Hippocrates himself to make a correct diagnosis in every case. What I do plead for, is that the medical profession will earnestly and sincerely endeavor to help the Bureau in every way to obtain a true statement as to the number of typhoids occurring in Philadelphia. I firmly believe if the truth were ascertained in reference to the three conditions which falsely increase the number of typhoids, namely, errors in diagnosis, cases contracted elsewhere and duplicate cases, that the percentage of true cases would be reduced one-half if not more than this. If we add to this the steady municipal improvements which Dr. Edward Martin and Dr. Abbott are earnestly striving for, namely, cleaner streets, better surface drainage and perfect under drainage, the abolition of cesspools, houses constructed with better scientific ventilation, careful disinfection of everything whereby typhoid may be transmitted, extreme vigilance on the part of the health authorities in reference to impure milk, adulterated foods, impure water, and a constant instruction to the general public in reference to those foods by which typhoid is often contracted, such as raw oysters, lettuce, over-ripe and unclean fruit, etc., it is reasonable to suppose there will come a time when a very few cases, if any, of typhoid fever will exist in Philadelphia.

DISCUSSION.

DR. EDWARD MARTIN: The elaborate examinations that Dr. Faries suggests before reporting a case of typhoid fever may be extremely difficult and quite impossible. The Bureau of Health cooperates to the effect of promptly making the Widal test and reporting as often as needful. We have not the staff to make the blood count, but the general wish is to have all the cases reported for the protection of the public at large. Statistics seem to show a certain amount of transference of typhoid fever from one case to another. The reason for reporting as far as the public health is concerned is to prevent this direct transference and to take precautions against the creation of a local epidemic. Local epidemics have been traced to milkshops and to bakeshops. In the majority of cases of typhoid in the well-to-do and those treated by men in their regular practice the community is properly protected. The dejecta are disinfected and the attendants are instructed in regard to precautions against the spread of the disease; but the typhoid cases that our own young men have to deal with are often poor and with them it is extremely important to have a report. We would much rather have a report of a case which is not typhoid with a subsequent correction of diagnosis than to have cases unreported until the diagnosis is confirmed beyond doubt. The question of the disinfection of the dejecta is a difficult one to settle. The epidemic at West Chester should teach a valuable lesson in reference to this point. We should not be indifferent to the people who get water below our pollutions. In convalescence the urinary excretion may remain for weeks a prolific source of infection. It is the wish of the Bureau of Health to have cooperation on the part of the profession by which this form of pollution may be prevented. We have made a statistical study of wells and cesspools and have been astonished to find hundreds in such juxtaposition that the water must almost inevitably be infected. We feel that while there are many sources of infection the water supply must remain the main source, and that Philadelphia phia will still be a typhoid-cursed city until we have a filtered water supply; that when the filtration comes in, typhoid will practically disappear from Philadelphia as a constant and rather discreditable endemic.

Dr. Faries: In a great many of the cases the assistant medical inspectors coincide with me that the cases are reported too quickly. The Bureau of Health receives many reports of cases when the patient has only been sick a day or two. We have no way whatever of ascertaining whether these prove to be typhoid or not, because we are not allowed to interfere with the family physician. It is the duty of the physician to be especially careful before he makes up his mind as to the diagnosis. If the case is well developed there is no doubt about it, but when the inspector has the experience of finding a patient well in 3 or 4 days and out of the house, there is great doubt that the condition was typhoid. Such cases multiply through the year. If there were some way of overcoming this, the percentage would be greatly reduced. We can determine the exact number of cases that originate outside of the city and of the duplicate cases, but the cases of error in diagnosis we cannot estimate.

Skiagraph of an Old Ununited Fracture of the Scaphoid Bone Illustrating the Value of the X-Rays in the Diagnosis of Such Fractures.

By L. J. Hammond, M. D.

[Read November 23.]

The frequency with which errors in diagnosis of rebellious and more or less obscure pains about the joints are lessening by reason of our having the invaluable aid of the X-rays, is clearly illustrated in the following case:

A male, aged 21 years, medical student, consulted me in the early spring of the present year for the purpose of securing relief from pain in his right wrist, from which he had been suffering for more than 2 years. There was no tenderness to touch nor any visible sign of inflammation, and it was only when the wrist was abducted that the pain was intense. The condition had been variously diagnosed as rheumatism, sprain, tuberculous periostitis and tendonitis. As a relief had not followed the treatment prescribed for any of these conditions, I advised him to have an X-ray picture taken of the joint. The skiagraph showed this rebellious pain to have been due to a fracture of the scaphoid bone, the fragments of which were united by a very loose fibrous connection. It would have been absolutely impossible to have made this diagnosis without the aid of the X-rays. With the amount of interposed fibrous tissue shown in the skiagraph, nothing could be done to lessen the unnatural amount of mobility of the fragments short of cutting down, removing the interposed fibrous tissue and wiring 2 fragments of bone together. This is the line of treatment that was pursued, with the result that perfect apposition of the fragments was secured and the fragments held in position by 2 small silver wire sutures There has been perfect restoration of all the wrist movements with entire absence of pain. Flexion, extension and abduction of the wrist, all of which were extremely painful before, are now accomplished without any discomfort whatever. It is interesting to learn from the history of this case that, while the patient recalls having fallen with the hand outstretched and abducted, no immediate symptoms such as pain, swelling or ecchymosis were sufficiently pronounced to compel him to seek surgical aid. This is doubtless the result of the character and position of the bone injured, the extent of motion in any one of the carpal bones, under normal conditions, being more or less limited.

It is because of the absence of the usual symptoms of fracture in these small bones, especially those of the wrist and ankle, that fractures in this region were, before the advent of the X-rays, so seldom diagnosed. One needs only to have experience in the surgical outpatient department of one of our city hospitals to learn how frequently factures of the bones of these joints not only have occurred, but have been entirely unrecognized, and even when recognized the usual treatment of fixation and immobilization does not secure bony union and therefore the patient will forever after, especially when the hand is abducted, suffer pain. The only treatment is to secure bony union. This can only be done by perfect apposition, either by wiring or any other of the mechanical means that are employed at the present day for union of fractures. Wiring being by far the most reliable procedure.

The separation of the fragments of the bones of the upper carpal row, it must be remembered, is usually considerable because of the palmar attachment of the anterior ligaments tending to evert th fragments and the marginal attachment of the capsular ligament on the dorsal surface, especially of this bone. The synovial cavity of the wrist joint was not opened in the operation, nor need it be if care is taken, because, as is well known, it is separated from the synovial pouches between the carpal bones by the interosseous ligaments. The opening of a single carpal pouch will have no significance if done under proper asepsis.

On account of the fact that these bones are composed so largely of cancelous tissue, covered by only a thin layer of compact tissue, they will early undergo considerable absorption and in many cases, unless the fragments are wired shortly after the fracture occurs, much difficulty will be experienced in finding enough bone to hold the sutures. In the case here recorded this condition had not, however, after so long a period, followed. In a case of long standing fracture of the os magnum, however, the loss of bone was so extensive as to defeat my efforts to secure apposition of the fragments.

DISCUSSION.

DR. CHARLES LESTER LEONARD: Many such cases as this have been reported, and no better work in that direction has been done than at the German Hospital by Mr. Wilbert. He has demonstrated the frequency of these fractures and the incapacitation they cause. The injuries are so obscure that they can be demonstrated in no other way. It is particularly true of the X-rays that they have demonstrated the slight injuries which frequently occur about the joint, the sprains, fractures and chipping of small fragments within the joint which lead to an incapacity of function. An injury of this sort is of importance to those who depend upon their hands as a means of livelihood. Such an examination of hospital patients should be made before the injury has become irremediable. I have in mind a lady who, while abroad, had an injury to her ankle and was told that she had a fracture of the fibula for which a plaster cast was put on. When this was removed the X-rays showed the tips of both malleoli gone so that she had a joint that was practically useless. It is the duty of the surgeon in all injuries about the joints to have such examination made for the purpose of excluding these fractures. The negative diagnosis is of much value to the patient in a saving of time and in bringing to bear the proper treatment at once. It is the duty of the general practitioner to see that the surgeon he calls in consultation employs this most accurate method in determining the exact extent of an injury, or in excluding these injuries that cannot be determined in any other way, in every obscure case. The exact knowledge secured renders the treatment more effective and often shortens the course of treatment by excluding serious injury or osseous lesions.

DR. HAMMOND: Fractures of this sort are by no means rare, though when uncomplicated they are usually overlooked and the condition treated as a sprain or some constitutional dyscrasia. The object of the paper is to emphasize the

importance of suspecting this type of fracture in rebellious pains in the joints. Notwithstanding the fact that the greater part of the bone will be absorbed if long left untreated, we have the fibrous tissue which is almost as liable to cause pain as is the bone. There are many reasons why these cases of obscure pain should be subjected to X-ray examination as the only possible means of diagnosis.

Syphilis of the Lung Simulating Phthisis.

BY WILLIAM E. HUGHES, M. D., AND ROBERT N. WILLSON, M. D.

[READ NOVEMBER 23.]

As early as 1858, Virchow described a pulmonary condition which he called "white hepatization" and which he noted especially in the lungs of syphilitic newly-born infants. He also noted a brown induration, and a collection of brown pigment in the lungs of a number of adults, accompanying a similar congenital "white hepatization." This pigmentation he considered due to an impediment to the blood stream in its passage through the pulmonary tissue, consequent upon the filling of the alveoli by round cells. Virchow apparently did not feel, however, like committing himself to the statement that these hepatized areas were undoubtedly syphilitic processes.

Wagner in 1863, Pavlinoff in 1879, Schnitzler in 1879, Hiller in 1884, Heller in 1888, and more recently many others, including Councilman, Greenfield, Kidd, Perry, Rolleston, Weber, Wilks, Aufrecht, and Stengel, have also reported cases of apparent syphilitic pulmonary involvement. The question is often asked, "In cases that do not come to autopsy can we be sure that the process has not been of a simple bronchopneumonic character, or even of a tubercular nature; especially since tuberculosis is a frequent accompaniment of syphilis?"

When such pathologists as Virchow fail to positively diagnose the condition under the microscope, how indeed are we to assure ourselves of the clinical condition in a doubtful case of pulmonary involvement in a syphilitic patient? And still more difficult, how shall we make the diagnosis in the presence of a doubtful pulmonary lesion in a case not supposedly, but actually, syphilitic? These are not only interesting queries, but practical issues, as the instance reported in this paper will demonstrate.

H. H., white, aged 32 years; born in Russia; now an ironworker. His father, mother, 2 brothers and 2 sisters living and well. Patient has had measles and smallpox. Has been repeatedly exposed to venereal infection, but denies

having suffered from venereal disease of any description. Claims never to have had a chancre or other sore upon his penis, or elsewhere on his body. Has experienced no sore throat, no alopecia and no eruption. Has always been engaged in hard labor, for years as a sailor, and recently as an ironworker. Six weeks prior to admission to the Philadelphia General Hospital on December 31, 1903, he contracted a "severe cold" which persisted about a month. He then became stronger and better physically, but the cough continued, as did also the expectoration which had been profuse from the outset. About December 15, 1903, he began to expectorate blood. At first this appeared in occasional small streaks in the sputum, but had gradually increased in quantity, until at the time of admission it appeared in quantity with every coughing attack. The patient then appeared well-nourished, of large muscular frame, his skin of good color and, except for his cough, he said he felt perfectly well. He was also frightened at the continual loss of blood.

The physical examination found his mouth and throat normal in appearance, the glands of the postcervical and sternomastoid regions not palpable, the pulse rapid and small and not easily compressible. The pupils were equal and reacted promptly to light and distance. The patient was righthanded, but on inspection the right chest seemed more prominent than normal, especially over the lower portion. The expansion was relatively impaired over this area, though still remarkably free. The measurement of the right chest from midsternum to the spine at the level of the 11th spinous process was 20 inches (50 cm.); that of the left side at a corresponding level was 18 inches (45 cm.): at the height of the scapular spine the right chest measured 20⅜ inches (50.9 cm.) and the left side 19⅜ inches (49 cm.). The expansion over the pulmonary bases was, on the right side ¾ of an inch, and ½ inch on the left. Percussion resonance was also impaired over the entire right lower lobe, especially posteriorly. Tactile fremitus was slightly increased. On deep inspiration, over a space as large as the palm of the hand, just below the upper border of the right lower lobe, fine crackling rales and a scraping friction sound were heard. Percussion over this area also gave distinct dulness, not amounting to flatness. Above and to the outside of this area skodaic tympany was easily obtained.

The middle and upper lobes on the right side showed prolonged inspiratory and expiratory sounds, also rather harsh, but no other abnormality. The apex was negative anteriorly and posteriorly. The left lung appeared to be altogether normal, except for a rather poor expansion. The abdominal examination was negative. There was no eruption on any portion of the body, and no scar nor induration was discoverable on the penis. The glands were enlarged only in the inguinal region, where both the deep and superficial chains were palpable on both sides.

From December 31, 1903, to the date of his discharge (January 14, 1904), temperature which was 100° F. on admission, varied between this point and 97° F., where it was disposed to remain during the last days of his stay in the hospital. The pulse was 110 on admission, and averaged 90 during the subsequent period. The respirations gradually fell from 30 to normal. The blood showed a slight reduction of hemoglobin; the urine was normal.

The patient experienced little or no discomfort on the right side, but had a constant hacking cough, and brought up enormous quantities (two or more sputumcupfuls) of sanguinopurulent matter daily. The expectoration was very profuse in the morning, shortly after rising. There were no nightsweats, there was little or no loss of weight, the appetite was good, and the general impression given was that of a man with a strictly localized pulmonary lesion, and a general economy that was still amply competent to combat the advance

On the presumption that the latter was tuberculous, the sputum was examined repeatedly, but on no occasion could tubercle bacilli be detected. Pneumococci were present in numbers. On January 6, 1904, there was no cessation on the part of the pulmonary bleeding, which had now become so free that there was more blood than mucopus in the sputum. The latter invariably showed, however, a thorough admixture with the blood, assuming rather a prune-juice than a bright red color. The patient was demonstrated on this day in Dr. Hughes' clinic, and an exploratory puncture made in the 8th interspace in the midscapular line. The first puncture yielded no fluid, probably owing to a faulty mechanism of the apparatus. The second insertion of the needle, however, to our surprise gave a syringeful of dark red blood, floating in which were large flakes of lymph, evidently from the surface of the pleura. The wound was sealed, and the patient returned to the ward in good condition, but still expectorating blood and mucopus as before.

In the doubt as to the diagnosis three conditions seemed possible, with the probability in the following order of mention: incipient pulmonary malignant disease, tubercular phthisis and syphilis. It seemed to be very improbable that the lesion was parasitic (actinomyces, hydatid, etc.), since no evidence pointing to such an origin could be discovered in the sputum. Calcium chlorid and gelatin were employed, together with prolonged, absolute rest in bed, but without effect upon the pulmonary bleeding, which appeared to be on the increase. This fact, together with the absence of constitutional involvement, and the circumstance that the patient appeared to be otherwise in excellent physical condition, seemed to render tuberculosis unlikely, though still of course possible. Syphilis was also considered, though deemed unlikely in the light of the entire absence of a history of primary, secondary or tertiary lesions. Moreover, pulmonary syphilis is by no means a frequent occurrence in medical literature.

The most probable condition, therefore, appeared to be an early malignant, in all likelihood sarcomatous, involvement of the lung and pleura and the tentative diagnosis of sarcoma was accordingly made. Microscopic examination of the flakes of lymph, obtained in the fluid drawn by puncture, it should be stated, gave no clue as to the nature of the pathologic process.

More as a matter of interest and empiricism than with the expectation of alleviating the symptoms, the patient was placed on January 7, 1904, upon large doses of potassium iodid (one dram three times a day) with the idea that harm could be done only in the unlikely event that the condition was tuberculous. To our astonishment and satisfaction within twenty-four hours the expectoration diminished in quantity and the patient stated that he was bringing up less blood. The treatment was persisted in, and after three days the sputum, while still free in quantity, contained no blood, the cough had largely disappeared, and the patient insisted on leaving the hospital in the belief that he was cured. He was persuaded to remain four days longer, and on January 14, 1904 could no longer be detained and was lost sight of. When discharged he was free from cough, his sputum was mucopurulent, but in slight quantity, and he himself felt perfectly well. The respiratory sounds over the area of former consolidation were still rough, and moist rales could be heard; the percussion note was almost similar in like positions on the right and left sides.

In looking back upon this case, it is natural at once to suggest that the condition was one of bronchopneumonia, with delayed resolution, the latter taking place finally at a time coincident with the administration of potassium iodid. This appeared to us so unlikely, however, that we excluded it in favor of less unlikely conditions. The duration for at least twelve weeks without seriously affecting the general condition of the patient, the free expectorating of prunejuice fluid, beginning with the eleventh week of the disease, and the prompt and seemingly almost complete, recovery from active symptoms within a week of the first administration of potassium iodid, all seemed to point to a condition other than that of a simple bronchopneumonic consolidation.

Malignant disease it certainly was not in the light of the result of treatment. Equally certain is the fact that we must now exclude tuberculosis, which, though sometimes remaining stationary under the influence of potassium iodid, is usually urged on into an acute exacerbation, and never is benefited by the drug.

We have remaining but one probable condition, pulmonary syphilis; and our diagnosis rests simply and solely up to the present moment upon exclusion and upon the therapeutic grounds. In speaking of this case to a genitourinary specialist, we were received with the comment, "So, this is what the internist calls syphilis!"

We would reply, "If not syphilis, what else?" There are many discoveries made by so-called chance, and by so-called experiment, and some of our most valuable items of knowledge have been obtained by reasoning backward, as it were, this method being the only one that offered a purchase from which to reason and observe in the right direction.

Even in the absence of the classical eruption, and the evidence of a primary sore, and even lacking a general glandular enlargement (none of which we believe to be indispensable accompaniments of latent syphilis) we feel compelled to look upon this case as one of pulmonary syphilis, at first latent, and then manifesting itself by the symptoms of a localized pulmonary lesion. Until our friends, who have up to this time spent their lives in a vain quest for the causal germ of syphilis, proclaim the success of their pursuit, we shall consider it our duty from the double standpoint of the patient and the clinician to regard such conditions as respond promptly to treatment by potassium iodid or mercury, and to no other, as luetic, provided, of course, that we find no evidence suggesting another condition as more probable.

It is interesting from the pathologic standpoint, and in view of Virchow's comment upon the occurrence of brown induration and pigment and its histogenesis, that so many of these cases present hemoptysis as a prominent clinical feature. Aufrecht's case is especially noteworthy in comparison with our own, in that the autopsy showed the presence of a tumor of coagulated blood, arching over the left bronchus, and pressing upon the tracheal wall. The tumor was formed "by an almost globelike dilation of the aorta, as large as a plum, communicating with the lumen of the arch by an opening one centimeter in diameter. The result of puncture in our case might well have been consequent upon the insertion of the needle into some such aneurysmal clot, or equally well into a circumscribed extravasation, due, as suggested by Virchow, to an impediment to the blood stream. In the latter event the stage of the disease when observed by us must have been one antecedent to that of brown induration and pigmentation.

Stengel gives the postmortem findings in one case of undoubted pulmonary syphilis, of which the clinical history was lacking. He also submits the clinical history of another case, first looked upon and treated as an instance of pulmonary tuberculosis, but recovering after six months of treatment with potassium iodid. The latter case is open to the objection, of course, that the improvement was so slow as to admit of question whether it was not a case of phthisis after all, recovering in spite of the use of potassium iodid. Many cases of recognized incipient phthisis do indeed recover within an even shorter period. In other words, the improvement may or may not have been due to the antispecific treatment. Certainly, however, the iodid had no deleterious effect. Stengel also quotes the interesting case of Brambilla, of a supposedly tuberculous patient being given the mercurial inunction intended for a syphilitic in the adjoining bed, followed by the prompt recovery from all his symptoms. The clinical histories of such cases must have at least one important influence, in the direction of proving that a certain few cases, apparently tuberculous, will improve and convalesce symptomatically under antisyphilitic treatment. This once determined, the question as to whether we can rightfully call them instances of pulmonary syphilis, assumes secondary importance.

The probability approaches a certainty more nearly with each new case, and in due time a sufficient number of postmortem records will have been obtained in cases that have shown just such a clinical history and the doubt will be dispelled.

In the meantime the uncertainty will cause some hesitation in the positive diagnosis of incipient tuberculosis in subjects known or suspected of being syphilitic.

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DISCUSSION.

DR. GEORGE E. PFAHLER: I remember that some time ago we had in Dr. Anders' ward at the Medico-Chirurgical Hospital a patient who presented the physical signs of phthisis and, in addition, the signs of a mediastinal growth. An X-ray examination showed the shadow of such a growth. We excluded everything except carcinoma and syphilis, and the majority of the points seemed to be in favor of syphilis. We placed the patient upon mercurial inunctions and potassium iodid, and while we could not keep him in the hospital long enough to determine the final result he improved very markedly under that treatment for the 6 weeks that it was used. On this account we were inclined to believe the suspected diagnosis correct. I would like to ask Dr. Willson whether an X-ray examination was made and whether there were any physical signs of mediastinal growth shown.

DR. WILLSON. As Dr. Curtin left the room he said to me that pulmonary syphilis had been a most interesting study to him, and expressed it as his belief also that the diagnosis often must rest upon the presence of a pulmonary lesion in the absence of equivalent constitutional symptoms. I neglected to mention the fact that there is another condition than syphilis which often responds promptly to potassium iodid, and which should always be considered in the diagnosis, namely, actinomyces consolidation. Two cases have recently been reported in which prompt relief followed the administration of potassium iodid. We considered an X-ray examination in this case unnecessary, because the physical signs were so extensive and so open. The only advantage offered by an X-ray examination would have been in the way of excluding the possibility of a solid tumor independent of the general consolidation. X-ray work is exceedingly expensive, this being undoubtedly one of the reasons why internists hesitate to use it more frequently.

The Differential Diagnosis and Treatment of Acute Pelvic Peritonitis of Gonorrheal Origin.

BY BROOKE M ANSPACH, M. D.

[Read December 14.]

The gonococcus, in the production of peritonitis, usually confines its effort to the pelvis; the general peritoneal cavity is but rarely invaded; even though it is, the prognosis of this form of general peritonitis contrasted with other forms is favorable.

It is equally true that pelvic peritonitis due to the gonococcus is not often fatal. Although there may be permanent disability and chronic invalidism as a consequence, there is not *per se* a fatal result. Because of these facts acute pelvic peritonitis of gonorrheal origin when confined to the pelvis may well be regarded as not immediately dangerous to life and as amenable to palliative treatment.

This form of peritonitis, however, bears in its clinical manifestation a resemblance close enough to appendicitis, to make its diagnosis a matter of great importance. Conservatism in the one is justifiable and safe while in the other it is conducive to serious results.

There is probably no intraperitoneal inflammation so treacherous as that of the vermiform appendix; an apparently mild case may quickly become lethal. Sometimes the diagnosis is not made until autopsy or operation. In those cases of peritonitis in which the origin is not evident clinically, the appendix has been very often the seat of disease.

This is without doubt very generally recognized and the physician today is more on his guard against overlooking or misjudging appendicitis than any other intraperitoneal inflammation.

It is important then to distinguish acute pelvic peritonitis of gonorrheal origin from acute appendicitis; and by acute pelvic peritonitis should be understood the inflammatory reaction which marks the initial passage of gonorrheal pus to the pelvic peritoneum. There is of course another form of pelvic peritonitis—viz., that produced by the ordinary pyogenic organisms—notably the streptococcus. The history however in this form clearly indicates a source of pyogenic infection—the symptoms are all more severe than in the gonorrheal form and it very rarely occurs except after evacuation of the pregnant uterus.

The subsequent attacks when the tube has begun to close with the formation of pyosalpinx may be just as acute as the primary ones but usually the pelvic mass found upon bimanual palpation in the secondary attack, makes the diagnosis more or less evident. In the cases under consideration, there may be at first no pronounced pelvic mass; a woman previously free from acute pelvic disturbance is seized with sharp pain in the lower abdomen, maybe worse on one or the other side, associated with constipation, distention of the abdomen, fever, increased pulse rate and more or less prostration.

Such symptoms very often indicate an acute inflammation of the appendix. It is to be remembered moreover that pelvic peritonitis may be and often is accompanied by appendicitis.

When appendicitis exists either alone or with inflammatory affections of the adnexa—an operation in the majority of cases is advisable. On the other hand, in acute pelvic peritonitis due to gonococcus infection, operation had better be postponed. In distinguishing between these two, the previous history of the patient often indicates a correct conclusion. Although gonorrhea in its early stage may escape the observation of the female, inquiries as to the existence of vesical irritability, leukorrhea, the origin of the symptoms with reference to the marital state, and with relation to the menstrual period, frequently elicit ground for a tentative opinion.

Inspection of the parts—the orifices of Skene's glands, the vulvovaginal glands and the cervix—gives additional evidence ofttimes the most positive. Inquiry should be made concerning the classical symptoms of appendicitis. The history of repeated attacks, of habitual overeating and of chronic indigestion together with the character and location of the pain, as a rule, afford a satisfactory clue. A comparative table of symptoms may be useful.

Gonococcus Pelvic Peritonitis.	*Appendicitis.*
History. Leukorrhea or vesical irritability soon after marriage or suspicious intercourse.	*History.* Previous similar attacks. Habitual overeating, chronic intestinal indigestion.
Onset. At or directly after a menstrual period.	*Onset.* After indiscretion in diet
Pain in lower abdomen—worse perhaps on one or other side.	*Pain* beginning in epigastrium—not well localized at first—later localized to appendiceal region.
Gastrointestinal Symptoms.	*Gastrointestinal Symptoms.*
Nausea, vomiting, constipation, less marked.	Nausea, vomiting, constipation, etc., more marked.

There is not so much to be learned by bimanual palpation as would be expected. Because of tenderness and rigidity a satisfactory examination of the tubes and ovaries without ether is frequently impossible. The position of the uterus, however, can be determined as well as the presence or absence of fixation of that organ. At an early stage there is little or no fixation and little pelvic exudate. So that the examination, although admittedly unsatisfactory, may be entirely negative. In the cases forming the basis of this paper, the initial examination was negative although the adnexa could not be definitely palpated; the uterus was freely movable and there was entire absence of any well-defined induration. Bimanual examination in cases of acute appendicitis is also usually negative in the absence of pelvic complications. When the appendix hangs over the pelvic brim, a mass may sometimes be felt, but this is rather exceptional unless there is an appendiceal abscess.

Abdominal tenderness and rigidity is present over the entire lower abdomen in acute pelvic peritonitis in contrast to the more localized tenderness and rigidity seen in appendicitis. Occasionally in gonococcus pelvic peritonitis, there is more pain and tenderness on one or the other side; if that side happens to be the right, the resemblance to appendicitis is increased.

Tenderness of appendiceal origin may sometimes be elicited upon bimanual palpation when the right adnexa are normal by drawing the uterus downwards and to the left side. This supposedly is due to traction upon the appendix by a fold of peritoneum running between the broad ligament and the mesoappendix.

There seems to be no question that acute appendicitis especially when it is severe enough to be confounded with acute pelvic peritonitis should be exposed to operation immediately. It is otherwise with acute gonorrheal pelvic peritonitis. Experience has shown that these cases do well if kept quiet in bed and given salines, copious douches of hot salt solution and applications of heat to the abdomen. Under such expectant treatment the temperature and pulserate gradually approach the normal—there is less abdominal pain and distention. All of the subjective symptoms may disappear in four or five days.

At this late stage bimanual examination finds more or less fixation of the uterus, pelvic exudate and enlargement of the adnexa. Operation during the acute attack, therefore, appears to be unwarranted and clinical experience bears out this view. Operation could not be followed by any better immediate result than palliation and during the acute stage it would expose the woman to acute general peritonitis.

Later on the gonorrheal pus becomes less infectious or inert; the economy has reacted to the toxic products thrown into the circulation, the extent of inflammatory involvement is recognized with less difficulty and there is not so much likelihood of leaving tissues behind which will subsequently give trouble.

One cannot afford to stop here in considering the treatment of this disease, for there is a possibility in every case that the infection may become general. In such an event the danger is much greater and the question of operative interference is of more moment. If the peritonitis does become general, it is best to perform laparotomy without delay.

Hunner, who has collected a series of eighteen cases of general gonococcus peritonitis in which the diagnosis was substantiated by bacteriologic evidence, found eleven recoveries and two deaths in thirteen cases subjected to operation; and five deaths in five cases not operated upon. He has further reported twenty-one cases in which the diagnosis was positive but based upon clinical evidence alone—in which there were eight recoveries and three deaths in eleven cases submitted to operation; and eight recoveries and two deaths in ten cases treated expectantly.

He is doubtful as to the advisability of operation but well says that the exclusion of other sources of infection in these serious cases is sometimes impossible. From the statistics Hunner himself quotes one can see that in the cases positively diagnosed as gonorrheal peritonitis there was a large percentage of recoveries following operation (eleven recoveries and two deaths in thirteen cases operated upon; five deaths in five cases treated expectantly).

If an opinion is based on this fact and surely this is a more reliable criterion than the result in those cases in which there was no bacteriologic confirmation, the question of operative interference must be answered in the affirmative. Therefore, in gonorrheal pelvic peritonitis if distention, vomiting, tenderness and rigidity show a constantly increasing tendency, if peristalsis diminishes, if the facies of septic intoxication appear, operation is advisable. If upon opening the abdomen the diagnosis of gonorrheal peritonitis is confirmed it is best to confine one's efforts to the evacuation of any intraperitoneal collections of fluid. According to Hunner it does no good to attempt to remove fibrinous deposits upon the bowel or to separate adhesions; this is often productive of harm by opening up new avenues for infection and may result in the formation of new adhesions and postoperative obstruction. The diseased tubes, he says, if they contain appreciable quantities of pus should be removed. While the social condition of the woman and her childbearing proclivities must be considered in such cases and no rule can be laid down, I believe that it is better to remove both tubes if they contain pus—whether they have gone on to the formation of pyosalpinx or not. In other intraabdominal infections, the source of the trouble requires removal for the immediate good of the patient and why should it not be so here? Moreover, if the tubes are allowed to remain, it is quite probable that they will either subsequently give trouble or that they will be functionally useless.

When the peritonitis remains confined to the pelvis under the palliative measures given, the symptoms will subside but there remain structural changes which may and usually do, call for operative interference.

The temperature of the patient returns to normal—the pulse rate diminishes and there is no spontaneous pain. At this time a bimanual examination is more satisfactory and gross inflammatory alterations are found about the adnexa. Whether an operation should be performed at this time or not and the extent and variety of such operation is an entirely different question from those we have been discussing. Although conservatism is advisable in many of the less serious cases of suppurative gonorrheal affections of the adnexa. These patients as a class would be better treated if they were exposed to operation as soon after an initial attack of acute pelvic peritonitis as structural lesions could be recognized in the pelvis. Certainly at this time there would be less need of a complete or very extensive operation.

I have selected the following cases, all occurring during the past year, as types of the condition under consideration:

Case 1.—R. H., single, aged 25 years. Two months before admission had sexual intercourse. One month before admission began to suffer from profuse irritating discharge. Present attack began 3 days before admission at the close of her last menstrual period. Sharp pain in lower abdomen especially marked on the left side. Admitted May 10, 1904. Temperature, 100°; pulse, 108; respiration, 20. Abdomen distended, marked tenderness and rigidity over lower abdomen, slight nausea, constipation. Condition after 36 hours' treatment: Temperature, 100°; pulse, 120; respiration, 24. Pelvic examination, bilateral pyosalpinx. May 11, 1904, operation, right salpingectomy, left salpingo-oophorectomy. Smears from peritoneum show gonococcus. Recovery complicated by suppuration of right ovary.

Case 2.—M. S., single, aged 21 years. At age of 19 had miscarriage 6 months' child. September, 1903, had another miscarriage. Present attack followed closely upon last menstrual period, November 23–27. Sharp pain in lower abdomen. Admitted November 29, 1903. Temperature, 103°; pulse, 132; respiration, 40. Abdomen distended, marked tenderness and rigidity, peristalsis diminished, slight nausea, constipation. Condition after 5 days' treatment: Temperature, 99°; pulse, 100; respiration, 24. Pelvic examination, bilateral tubo-ovarian masses. Skene's glands, vulvovaginal glands show macula gonorrhoicæ. Operation, December 3, 1904. Bilateral Salpingectomy. Uneventful recovery.

Case 3.—A. S., single, aged 20 years. For past 2 years has had leukorrheal discharge. Last menstrual period ended November 1, 1903. Attack began November 4, 1903. At this time discharge ceased; sharp pain in lower abdomen, continued and grew worse until November 17, 1903, when it was so severe that she was compelled to go to bed. Admitted November 18, 1903. Temperature, 103°; pulse, 110; respiration, 28. Abdomen distended, pain and tenderness and rigidity in lower quadrant, constipation, nausea. Condition after 6 days' treatment: Temperature, pulse and respiration normal. Pelvic examination, bilateral pyosalpinx, Skene's glands, vulvovaginal glands show macula gonorrhoicæ. Operation November 30, 1903, left salpingooophorectomy, right salpingectomy. Recovery.

The first case illustrates the difficulty sometimes experienced in deciding when to dispense with expectant treatment and enter the abdomen. After 36 hours of rest in bed the use of salines and hot douches the symptoms seemed to indicate that the infection was becoming general; accordingly celiotomy was performed. The infection was found entirely confined to the pelvis and it would have been better to have postponed the operation until the acute stage had passed.

As a result of this interference during the active period the right ovary, which was conserved with the uterus, underwent suppuration—the incision also broke down. In both of the other cases the healing was *per primam* and the convalescence was in every way normal.

In conclusion I wish to thank Dr. Clark for the privilege of reporting these cases, all of which occurred in his service at the University Hospital.

DISCUSSION.

DR. CHARLES P. NOBLE: Dr. Anspach's paper is so sound that there is less to say in discussion than otherwise would be the case. As my experience increases I expect less from conservatism in gonorrheal salpingitis than formerly. I think Dr. Anspach's views regarding operation in acute gonorrheal peritonitis are correct. I recall having operated only twice during an acute gonorrheal peritonitis. In one case the peritonitis was quite diffuse, but the patient recovered. In the other case there was a large abscess to the left of the sigmoid. That patient, who also recovered, illustrates a condition that I have seen a number of times; namely, that while a woman is in the hospital for a plastic operation her husband contracts gonorrhea and she very promptly contracts gonorrhea after returning home. In other types of pelvic peritonitis it is at times possible to open Douglas' pouch and prevent extension to the general peritoneum, but in the gonorrheal type this is seldom advisable. I have operated a few times after suppuration has taken place. One of the few cases in which the results of conservatism were good was that of a young woman who had acquired gonorrhea and in which peritonitis resulted in an intraperitoneal pelvic abscess. I operated in the acute attack and drained *per vagiam* and somewhat to my surprise she made not only an immediate but also a permanent recovery. She has been married since and borne children, so at least one of the tubes has remained sound. It is my general rule, in operating for gonorrheal pus tubes not only to take out both tubes but also to remove the uterus and the ovaries, unless the patient is a young woman. After a woman is 35, with double gonorrheal salpingitis her prospects for future health are better if she has a hysterectomy done than any less radical operation. I might add that I have never seen a patient die from gonorrheal peritonitis.

DR. JOHN G. CLARK: Dr. Anspach's paper brings prominently into the foreground; first, the rarity of general gonococcal peritonitis; second, the inadvisability of operating in the midst of a gonococcal peritonitis; third, the difficulties in some instances of making a differential diagnosis between the usual septic and gonococcal peritonitis. From the review of cases in the literature of this subject it is evident that general peritonitis produced by the gonococcus is very rare, for at most not more than a score of cases have been reported. My own belief is that the gonococcus does not produce a peritonitis for the same reason that it is not, as a rule, capable of exciting more than a passing inflammation in other than stratified epithelial surfaces. The normal habitat of the gonococcus is the mucous membrane and, with the exception of the conjunctiva, it grows with the greatest difficulty in other tissues. Therefore, notwithstanding the fact that the patient may have a very acute, purulent salpingitis with the pus escaping into the peritoneal cavity, at most it excites, as a rule, only a pelvic peritonitis, and this I take to be a chemical reaction from the toxins rather than due to the actual propagation of the germ. If the remainder of the peritoneal cavity is functionally active the toxins of the gonococcus may be dispersed, and they do not even exercise sufficient irritation within the cavity to cause widespread adhesions. The adhesions usually occur in the pelvis in the vicinity of the Fallopian tubes where this organism is present and the peritoneum is subjected to this constant irritation. Gonococcal inflammation of the Fallopian tube tends to become a chronic process, characterized by periods of quiescence and exacerbation, and it is quite evident that with a continuous source of irritation in the pelvis adhesions must take place. If, therefore, we had a well defined method of differential diagnosis and could always establish with certainty the presence of gonococcal peritonitis, the law as to operation would be never to interfere surgically until the period of quiescence is reached. The disadvantages and dangers of an operation in the acute stage of the peritonitis is demonstrated in one of the cases which Dr. Anspach has reported. The patient when admitted to the gynecological ward was suffering with all of the symptoms of peritonitis, and yet the history and general appearance of the woman, together with other signs, pointed to the strong probability of its gonococcal origin. We, therefore, felt justified in waiting, but within 36 hours as the symptoms were increasing in severity rather than growing better, and fearing that we had to deal with a pyogenic case, an operation was performed. The peritonitis was largely confined to the pelvis; both tubes were acutely suppurating; the ovary on one side had already become affected, but on the opposite side it seemed wiser to attempt to save it. Subsequent to the operation I have never seen such a rapid formation of a large pelvic abscess as occurred in this case. The abdominal incision reopened, discharging a large quantity of pus in which there were myriads of gonococci. From the post-operative view of this case it would have been unquestionably better to have waited until the patient's acute symptoms subsided, as I have no doubt would have been the case, and then operated at a less active stage of the infection. This case, however, represents the type in which the diagnosis, although very strongly in favor of gonococcal infection, could not be so accurately diagnosed as to make us feel comfortable in waiting for its subsidence. As to the differential diagnosis between peritonitis due to gonorrhea and to appendicitis, the chief points relate to the radically different histories of the 2 cases. In the majority of cases examination in appendicitis does not give pain when deep indentation is made in the vaginal fornix. On the contrary, acute inflammation of the uterus and appendages is almost always characterized by this sign. And then too, the diagnostic point which Dr. Anspach has alluded to and which I am certain should be very strongly emphasized is the pain in cases of appendicitis caused by manually tugging upon the uterus. Under this test the fold of peritoneum between the broad ligament and appendix is put upon the stretch, and the patient will, as a rule, complain of pain not in the pelvis but beneath McBurney's point. Relative to the unsatisfactory results from conservative surgery in gonorrheal cases, I am in accord with Dr. Noble. For the past 5 or 6 years it has been my policy to conserve all possible ovarian tissue, because as a rule this disease occurs in young women. While our conservative policy is working splendidly in some cases, I am being gradually forced to the conclusion that in many instances it only partially relieves the patient. If the operation is performed during the acute stage of the gonococcal infection it is extremely difficult to conserve any tissue, whereas if one waits until the acute inflammation has subsided, I many times find that the ovaries are completely free from disease, and at most this is of a superficial character (perioophoritis), consequently one or both ovaries may be left behind. This policy I am in general satisfied with for I am certain that, taking into consideration the differences in the nervous upheaval in the woman who has had double oophorectomy performed and the woman in whom one ovary has been left, the results are much in favor of the latter and I am strongly of the opinion that it is always wisest to follow this policy first, although it is possible that subsequently a second operation will have to be performed. If, on the other hand, in the quiescent stage it is found that the ovaries and tubes are bound together in one adherent mass, and in the attempt to enucleate the mass the ovary is found to be friable, tearing to pieces easily, and is evidently the seat of disease, it is the wiser policy to make a thorough enucleation.

DR. EDWARD MARTIN: My experience with these cases in recent years has been only for such time as is needful to transfer the patients to the hands of a competent gynecologist; but in the earlier days when I did a little of everything I saw a good many such cases. This was at a time when women were untrained in modern ways and when they looked upon celiotomy as a formidable operation to be rejected rather than a trifling minor procedure to clamor for. These cases all made a more or less prompt recovery under conservative treatment of the acute attack. I know the subsequent history of none of them.

DR. ANSPACH. One of the points that I wanted to bring out in my paper is that in many cases of acute pelvic peritonitis due to gonorrhea not much is gained by bimanual examination. All in the series reported were correctly diagnosed, but I would not have been able to form a positive opinion had I not been able to get the history and see the associated signs of a gonorrheal infection. It is not surprising that we do not learn much by bimanual examination. The tubes may not be larger than the ring finger and with a rigid abdominal wall examination is unsatisfactory. In the later stages after the infection has become localized and you do feel a pelvic mass, even in some of these cases, what you feel is not so much the tube as it is the abscess between the fimbriated extremity of the tube and the pelvic wall.

The Significance of Abulic Symptoms in Cases of Mental Disease.

BY ROBERT H. CHASE, M. D.

[Read December 14.]

In presenting to you tonight a problem in psychiatry, I am conscious that in these days when the problems of medicine have grown so complex, one has little time to devote to the technical discussions of his neighbor, especially if they be in a field foreign to his own thought and study. Holding this in view then, I shall endeavor to avoid a too formal presentation of my theme, hoping to gain your interest in some measure by calling your attention to a few special features of general application.

The term abulia designates, in a general way, a weakening or a diminution of the will force of the individual. It finds expression in hesitation, indecision and in many forms of powerlessness, as well as in the defective energy of attention; in the normal state it is seen for instance in the inertia of convalescence and in the lassitude of springtime. This mental inaptitude has long been familiar to physicians, who observe it in various forms of mental and nervous disease. Besides hysteria, where it strongly prevails, it is common in all of the forms in which the chief characteristic is inactivity of the mind. It is particularly conspicuous in melancholia, dementia precox and in the depressive types of general paresis; in some conditions of neurasthenia and psychasthenia; in the intoxication of opium and alcohol; in the retardation of manic-depressive insanity; in short, among patients generally suffering from weakness or exhaustion of the mental processes.

For the convenience of study the subject may be divided into systematized, localized and general abulia. It is not my present purpose to go fully into these subdivisions, but only to point out some of the salient facts as we proceed. Systematized abulia, as the term implies, is not a lack of will power in general acts, but in a particular act or a system of special acts. It is not an easy task to differentiate systematized abulia with accuracy. The difficulty may be appreciated when one remembers that there are other ways by which a particular act may be suppressed, as in some instances by a fixed idea or in others by amnesia. In an elucidation of the question it is helpful to bear in mind that every volitional act contains two principal parts, *i. e.*, the sensory and motor sides. When an isolated act has passed out of memory, it is not easy to say which side of the arc is impaired. Certainly these phenomena "not-knowing" and "not-being-able," as they are called, are closely related, and in the normal man they are almost wholly confounded. But in certain mental cases we are obliged to make a distinction. A person who knows what should be done, but who cannot find in his mind the means of effecting it, who has simply forgotten the way of going about it, is not identical with the patient who does not give himself the trouble to conceive the act and makes no effort toward it. In the first instance he is amnesic, in the second, abulic. From a prognostic standpoint it is a matter of importance.

As an example, astasia abasia is a form of amnesia of the motor images and not a form of abulia, properly so-called. Some authors believe that the "not-willing" variety is met with more frequently in the generalized abulias and the "not-being-able" in the systematized forms. This is equivalent to saying that the latter are generally amnesias.

Of the systematized abulias Janet, an eminent French writer of the Charcot school, gives the abulia of sleep. This may seem odd to us for we do not generally speak of sleep as a volitional act, or connect it in any way with the will. But nevertheless the will, according to this author, plays an important part in this function. Certain persons who enjoy a great power of will over themselves fall asleep when they wish, no matter at what time of day or night. Napoleon was noted for his control of sleep, and his celebrated phrase is well known: "When I wish to interrupt a certain affair," he said, "I shut up its drawer and open that of another. They do not mingle with each other, and never trouble or fatigue me. If I think I wish to sleep, I close all the drawers and straightway I'm asleep." It is a familiar fact among hypnotists that sleep is suggested like any other act. This tends to show that sleep is a form of action under the control of the will, which may be influenced by our ideas. In view of the prevalence of disturbances of sleep in mental and nervous diseases this aspect of it is not without interest. In many of these cases the difficulty of inducing sleep is very great. The root of the trouble often lies in a lack of capacity on the part of the patient to learn how to become sleepy. When in consequence of fatigue the abulia is increased, we find in them also that the insomnia increases in equal proportion. Furthermore, a patient of this character cannot awaken by herself after sleep, or being only half awake does not seem to have the power to be wholly in one state or the other. This experience, in a mild form, is not an uncommon event even in normal persons. Who has not found himself in the halfawake state, following a night's sleep, gently enthralled by a dreamy reverie, from which he is unable to awaken until a motive idea as a stimulus calls the will to action.

The general abulias, which apply at the same time to both action and thought are practically of more importance. General abulias of the motor type are of all degrees of intensity from slight hesitation of voluntary acts to extreme indecision and powerlessness. This condition cannot be explained by any form of paralysis nor can it be attributed to a fixed idea. In the milder forms such acts become painful, slow, of short duration and are interrupted with innumerable delays. The patient takes an interminable time to dress, to sew a few stitches, or write the simplest letter. He experiences especially a great pain in coming to a decision and in beginning any new work. To succeed in doing anything at all, these patients are obliged to divide and subdivide acts which appear to others very simple, and notwithstanding the greatest deliberation they never succeed in doing anything of a complex nature.

One of the forms of general abulia is the intellectual type. Before considering this class of abulias I need first to recall to mind certain functions of the will. It should be remembered that the will has not only a motor action, as applied to muscular reaction, but it is intimately associated with the production and expression of our ideas. In fact, such authors as Wundt and Bustian regard this intellectual function of the will as the essential role, and that its acts are only its outer manifestations. This intellectual action of the will is commonly called attention. Its chief result is to isolate certain sensations, percepts, memory images, etc., so as to make it possible for apperception to combine them, and to give us the "intelligence of things." It is obvious that the attention is a very important constituent of mind and it plays an equally prominent role in mental disease.

For many years it has been a well-recognized fact that the feelings are the first element of mind to indicate a disturbance at the onset of mental breakdown. But it has not been generally known that nearly coincident with this change in the feelings we have in the volitional sphere a disturbance of the attention, as an early symptom in many cases of insanity. This is seen in the marked weakening of voluntary attention and as an immediate consequence the patient may become confused, restless and maniacal. Again, one of the special functions of attention is its protecting influence on the higher mental mechanism. As we are constituted myriads of sensations are constantly crowding in upon the sensorium. Now it is just here that the attention performs its marvelous office. It stands as a screen, as it were, defending the delicate fabric of mind from this terrible assault. Were it not for its protection no human mind would be able for long to maintain its integrity. When voluntary attention in the process of disease has become much weakened in an individual case, then not infrequently ensues the train of symptoms which we have described—the patient passes abruptly into a state of delirium.

The defects of attention were pointed out as long ago as 1834 by

Leuret, by Billod in 1843 and by many recent writers. Guge of Amsterdam having seen analogous modifications of attention in his observations of adenoids gave them the name of aprosexia; a name which has been so generally well received that it has been applied to this disorder of attention when occurring in mental and nervous diseases. Aprosexia in mild form can often be detected by asking the patient to read a few lines from a book or newspaper. Usually the patient being told to read aloud, does so correctly, although with monotony, but when finished it is found that she understands nothing that she has read. To be sure she pronounces the words clearly and comprehends the meaning of each one separately, but the sense of the paragraph escapes her wholly.

This disorder is a particular defect of attention and is not due to trouble of sensation or perception or to the association of ideas in the ordinary sense. Some authors have attributed it to defective memory, but experiments with these cases prove that the trouble does not arise from amnesia. If aprosexia increases, this lack of recognition will show itself not only in reading, but in the simple perception of outward objects. This psychologic phenomenon is seen in the babble and rhyming of acute maniacal states of the insane. In them it is not unusual that they fail to recognize their surroundings and mistake for others the persons whom they casually see. Apprehensive of harm they read into the unfamiliar objects about them agencies which portend them ill. Sometimes this trouble is shown, not in the perception of visual images, but in the perception of auditory sensations. As I said before, the primary symptom of mental breakdown may be shown by this trouble and as it becomes more severe the disease may pass into melancholia or maniacal excitement. When the power of attention is simply diminished a number of complex disturbances may be observed: (1) Attention is very slow and very difficult to fix; when let alone the patient gives herself up to silent or babbling reverie.

(2) When the patient is persistently urged to fix her attention the effort is attended with much suffering, the result of extreme anxiety, which frequently produces a very severe headache. The patient who fears these headaches avoids the exercise of attention as much as possible. A young man of this class said: "When I am with intimate friends I do not try often to pay attention, I just let myself go."

(3) These subjective symptoms which occur during the exercise of attention are accompanied by objective symptoms, such as invol-

untary motor disturbances, and in hysterics the development of new anesthesias. In the effort of attention these patients are prone to exhaust the small amount of mental force which they possess. If she be anesthetic only on one side she becomes so on both; the sense of smell is lost and the visual field contracts. Sometimes under forced effort blindness may temporarily ensue. Not only the sensations, but also the movements are neglected. In this way grimaces, tics, jerks of arms and limbs may occur of which the person may not be aware. In the absent-minded absorption of maniacal attacks in the insane the phenomena of echolalia may be frequently seen. It is a variety of subconscious act, which has its explanation in this defect of the power of attention. While speaking of this disturbance of movement, attention may be called to the involuntary movements that take place in children when learning to write or in the performance of other unfamiliar acts of a complex nature. In some susceptible persons this tendency is more than usually conspicuous, showing itself in odd mannerisms and in peculiar eccentricities of conduct. It is a striking characteristic of persons of feeble mind. Anyone who has heard Blind Tom in the remarkable exhibitions of his musical talents will remember this feature in him while listening to a new score which he was expected to play at once by ear. The full vigor of his mind, being absorbed in a strong effort of attention, left the reflex actions of the lower centres unguarded by proper inhibition.

(4) This very painful attention just referred to does not usually last long in abulic patients; it oscillates, ceases, returns for a moment and after a variable time disappears. Some patients simply turn their eyes away from their work, say they cannot continue, complaining of severe headache. With others great exhaustion comes on as they cannot do anything or feel anything for awhile. In a recent case (D. E.) after an effort to read for a short time the patient complained of pain in his eyes, which watered and without further warning temporary blindness supervened.

The same exhaustion may become manifest not in the senses but in the intelligence itself. Janet tells of one of his abulic patients who becoming much interested in a scientific explanation he was making was seized after a few moments' efforts with complete aprosexia from which she did not recover until the next day. In this case she suddenly stopped, fixed her eyes intently with complete immobility on the ground. She had the appearance of being deeply absorbed in thought, but she was not; she was in one of her customary crises. It is a condition of automatic reverie, supervening as a result of the total exhaustion of voluntary attention. This phenomenon in a mild form is often experienced in the normal state of health by a person who may be more or less fatigued. Suddenly the eyes become involuntarily fixed and immobile and are fastened on the ground with intense gaze as though in deep thought. But it is a deceptive appearance for the mental state is the reverse of that of absorbed attention. This automatic reverie is common at least in elderly people. The soothing influence of a cigar or pipe conduces to it; it is the state that supervenes just before one loses himself in sleep. There are persons, especially past middle life, who, while not particularly religious or spiritual-minded, find much enjoyment by attending Quaker meeting. The obvious explanation is that under this worthy guise they find opportunity to indulge in this pleasant form of reverie; it gives also a clue to that unbecoming habit of sleeping in meeting which gives devout Friends so great concern. Another result of exhausted power of attention is to throw certain patients into violent attacks of motor excitement. Janet gives the case of a little boy who was sent to his physician from school because he had convulsions every time he was made to give strict attention to his studies. Bevan Lewis observed a case of general paresis that developed convulsions on being pressed to solve a difficult problem in mathematics.

Patients who have a moderate degree of aprosexia succeed finally in understanding, they form ideas of things but they are ill-formed; they lack clearness and stability; they grasp the idea imperfectly and it soon escapes them. Hence, doubt is one of the characteristic symptoms in states of mental abulia. This fact explains the prevalence of obsessions among the nervous and insane. This doubting spirit is seen not only in the objects of sense but it also applies to memory and fancy. These patients represent to themselves the past badly and the future equally so. They doubt what they have done and what they are going to do. One doubts about the past and has false remorse; another has imaginary fears; one accuses everybody of falsifying and another accuses herself in like manner. Finally, another characteristic of aprosexia should be mentioned. It consists in an impression of novelty in which things take on a strange or unfamiliar appearance. Objects and persons take on a strange or curious aspect, which constantly excites their surprise or apprehension. This astonishment is often the starting point of a series of questions, and when the patient is predisposed to obsessions they get easily in this way into the nervous doubting state, termed "*folie du doute*" or doubting insanity.

On the Advisability of a National Department of Public Health and a Medical Cabinet Officer.

BY T. HORACE EVANS, M. D.

[Read December 14.]

To start out with an idea of the late Dr. William Pepper, is a safe and advantageous proceeding.

I remember, some years ago hearing him speak earnestly in favor of the establishment at Washington of some central medical office into the hands of which the management of national hygiene and preventive medicine should be settled. My sympathies were then aroused by the earnestness with which he advanced his idea, and in the years since, I have felt that we could add a worthy monument to his memory in carrying it to a practical fulfilment.

We must not overlook the peculiar place that practical physiology, if I may so term a form of that study, holds now in the minds of the people.

With all the fluctuation, the centre of interest for the people remains the same—the welfare of body primarily, and of soul, afterward. The clinical aspect of religion is seen in the attitude of the patient to his prospective end and his eagerness to have life prolonged. In days past the main efforts of pagan theogonies were directed to the laudable object of the physical and physiologic welfare of the faithful. People besought the gods to save their lives, their families and their property. A certain sort of medicine grew up in the shadow of tradition and superstition where all was fear and trembling "lest a worse thing fall upon you." That day is now transcended. But the old fears and respects still cling to us—transferred to a new allegiance, and another set of pathogenic agencies.

A curious parallel exists between the incantations to devils and the lustrations, ceremonies and methods of earlier civilization, and our present-day disinfections, vaccinations and antiseptic procedures. But the positivist explanation of the eras of religion, metaphysics and science, is interestingly borne out; for today we fight with eyes open and senses alert to the efficient causes of disease.

It is right, therefore, that medicine should be incorporated with government—government of the people, by the people and for the people. If any doubt of this exists it will be overcome with the knowledge of the intimate relationship of disease to the prevalence of crime.

One cannot assert that crime in itself is physical disease. Crime is the cancer, the death-process of the modes of civilization. For us, disease has a place in evolutionary perfection and death is but a truer name for the organic successions of life, so crime is, perhaps, a necessary feature of social development; but neither crime nor disease can be predominant factors admitting of mental and moral progress. And with the intimate relation of body, mind, and morals we must expect and do find that a direct ratio is present. The interference of Medicine with government thus justified, what particular office can it fill?

To me, the right of Medicine in government is plainly that of controlling, in principle and effect, every matter which concerns the physiologic being of the citizen. It may not be possible in these days to carry out so broad a purpose. But much can be done. I grant to Law the right of formulating the boundaries of social conduct. Once the criminal is apprehended and brought within the meaning of the legal formula, his subsequent treatment is the treatment of a physiologic entity—and Medicine should claim him as its ward.

I leave the economic question of imprisonment to the decision of those who study matters from that standpoint. But what shall the physician say to imprisonment of a living being in practically a tomb? Cellular imprisonment as a punishment of wrongdoing is essentially a thing of today—unknown practically before except as a means to safeguard the criminal until trial, imprisonment has become within the recent two hundred years our panacea for treatment of every form of immorality. It is quite true that the condition of servitude is not always justly appreciated on the part of the convict; many are so degraded as to feel the stigma and restraint scarcely at all, or to take an immoral pleasure, even, in the situation. But if such conditions of imprisonment are painful and harmful to the normal man, why do we believe them efficacious in creating normal and moral sentiments in the degenerate? It is time for us in Medicine to devise a mode of isolation of criminals, not for punishment, but for curative and prophylactic effect, and to raise our voices against the utterly anomalous and disorganizing practices which now hold for treating such unfortunates. Unfortunate they are, with the weight of unhygienic and immoral environment to contend against in most cases from youth up.

The light is breaking in some sections of the country, however; prison reform is gaining. But what shall we say to the Jersey-justice which places in one cell a confessed wifemurderer and a fourteen-year-old petty thief! And what shall we say to the authorities who permit epileptic criminals to be sweated and mentally tormented by detectives to whom no principles of psychology may appear even in their wildest dreams?

I insist that the management of social offenders, as well as of physiologic shortcomers, is wholly a matter for the medical profession, and a duty which we shall sooner or later have to undertake and by the results of which the future will certainly judge our science and our faith.

We cannot avoid the relationships of physical and moral welfare. To deny them is to negative the principle of cause and effect. With our understanding of the conditions of health and disease in the body we must be willing to accept the wider obligation which works out in the morals of the community.

Marriage and education are immense problems growing out of elementary protoplasmic efforts. Few of us favor the fixed formulas of patented prescriptions to treat the individual cases of disease. Yet how many of us hasten to lay down rigid rules of procedure in marriage and education. Why do we insist that children must at such and such an age be fit to enter such and such a course of study? Why do we force children regardless of taste, ability and physical fitness to remain shut up during the best hours of the day learning no one knows what less than their parents and guardians? I could laugh at the system which enthrones itself on a heap of dusty volumes of musty matter that is certain soon to become obsolete, while out of the window the birds run trills in seven sharps, and twitter in every key from D major to G♭ minor—and the pedagog is too busy standing his pupils against the wall to realize that he knows no difference in the scale of sound and very little, perhaps, in that of color.

Yet the eye and the ear are the wonders of physiologic development. The few of us who dare to seize on color and sound are derided for being poets, mystics, bohemians and temperamental cranks. There is plenty of room for true physicians to encourage a broader and nobler education. Let us leave our technical branches to voluntary study, and with higher objects in view than the boy or girl of a dozen years can ever be forced to artificialize.

I will not discuss so sacred a thing as marriage in the scant words I dare take time for, now. But I want to strike a warning against factitious and unnecessary regulation of it. We must be watchful that in the press of material and social claims the vitality of the race be not stamped out. Evolution will not hesitate to override the species that values its continuity lightly.

Less important, but important to a degree, and in the province of a national department of health are questions of the proper training and licensing of practitioners of medicine and surgery, the care of contagious patients and of the sick-poor generally. I believe that a new department of medicine is opening: the management of contagious affections. The time will probably come when the general practitioner will have nothing to do with them. Oversight of these diseases ought certainly to be centralized.

Mental and moral defectives need the supervision of the State. To restrain them in suitable colonies would be the means of greatly reducing crime. The criminal class is largely recruited from these incapables, and who have failed to find honorable occupation more often from actual disability than from perversity. By far the cheaper and more effective manner of controlling crime is to guard those who are candidates for it, in some reasonable and honorable way before, rather than after, the damage may be committed.

The central government alone can attend to these broad questions of education, marriage, mental and moral hygiene, physics and preventive medicine; why not establish, then, a national department of public health to consider and carry out practical efforts to the end of the physiologic betterment of the people?

The only body of men in the country trained to do this work to be found in our profession. It should be our unselfish and earnest plea for representation in the circle of the Chief Executive's advisors.

DISCUSSION.

DR. EDWARD MARTIN: Dr. Evans has so voiced the general sentiment n the many topics which he has touched upon that his paper is a difficult one to discuss. I am thoroughly in favor of forced education during the period of youth. It is one of the compensations of age to realize the consequent immunity from the dull misery depicted in the faces of the school-going children, each with his 4 to 6 hours of compulsory, uninteresting and often unprofitable toil stretching drearily before him. It does not strike me, however, that the regulation of this matter would come under the head of a centralized health organization in Washington; rather would it be a matter of State or municipal control. In regard to criminals, a man who is stabbed or clubbed suffers quite as much when he is thus maltreated by a man of sound mind as when the outrage is inflicted by one of unsound mind. The question of imprisoning them is not so much a question of punishment as one of protection of the rest of the community. Too much leniency has been practised on the basis of mental defects and irresponsibility. It is certain that the establishment of a department in Washington with a central head (and we would all like to have seen Dr. Pepper at that head) is a means calculated to bring into greater repute the profession of medicine. It is true that the medical man to-day is the best educated man in the world. This idea of centralization is applicable to the subject of sanitation and prophylaxis, particularly against contagious diseases and to such general subjects as water pollution. It is also true that the United States Army Medical Corps and the Marine Hospital Corps are doing splendid service which in many respects affects the entire country, but these corps cannot take the place of a National Board and it is the establishment of such a one that we all hope to see.

DR. CHARLES K. MILLS: Personally, I believe that much could be accomplished by the establishment of a national health department of some description. It is, however, a question more difficult of solution than would seem to physicians who have only their side of the subject before them. With regard to the question of making a medical cabinet officer, I would be very glad to see my own profession honored in this way, and I believe much good might come from it. It might, however, be as well if a department of science were created with bureaus, including a national bureau of health which would take cognizance of State medicine. The great advantage of such an office would be the unifying of methods of procedure with regard to matters concerning health in all parts of the country In this country and in every democratic country like this we must always have a combination of centralization with communal autonomy and State autonomy, and especially with reference to matters of health and our treatment of crime. With a national medical department much might be done to improve our management of quarantine, the pollution of rivers and the registration of physicians.

DR. W. S. WADSWORTH: It seems to me very appropriate for this county society of the oldest and in many ways the most advanced medical centre in the country to consider this topic. We are, perhaps, a little ahead of the times in so doing, but that is just where we should be. State medicine is but in its infancy in this country, and when it reaches its full development we will realize its tremendous importance. Truly, as Dr. Martin has said, we have the Army Medical Department and the Public Health and Marine Hospital service, and, as he also very truly says, they are both doing very good work. Studying the rise and growth of these departments, beginning in Revolutionary times and following them to the present day, we see a line of large changes chiefly influenced by forces outside these departments, and it is but natural that the future should hold proportionately large changes influenced even more by just such broadminded thinking as this society can contribute. To anyone familiar with the nature of the medical service in the departments in the Army and Navy it is evident that something very different will be needed to make a Department of Public Health what it should be. The present placing of a Health Department under that of the Treasury Department can only be a temporary expedient, not to be long tolerated by an intelligent nation. The rapidly increasing complications arising from interstate activity are fast outgrowing the capacity and the limitations of the present system. Those who have thoughtfully observed these things see the urgent need for a new department. The exact limits of its jurisdiction may require careful thought, but its general functions will be easily grasped. Certain investigations must be carried on either in conjunction with those already undertaken by existing departments or independently in either case by subsidiary bureaus certain recommendations for legislation must be formulated as a result of those investigations. But most important of all, there must be an executive head, who should be a man capable of following all the investigations and of instigating all desirable ones and of realizing the values to be placed on the results of investigation. Now it would be as natural to propose anyone—not a lawyer—for Attorney-General as to suppose that the head of such a department should be other than a medical man. The scope of the work of this Department has been hinted at, and I will only lay stress on such subjects as have not been fully covered. (1) Such a department could move for such great improvements as the harmonizing of the laws of the States regarding the practice of medicine, registration of births and deaths and communicable disease; (2) the regulation of the sale of impure and dangerous drugs and foods such as are still made at home and imported freely from abroad; (3) the care of epidemics, which has heretofore been left to certain amateur organizations that have done good service, but nevertheless have left much to be done; (4) the handling of such diseases as malaria and consumption; (5) the regulations of factories and railroads and mines—specially needed—communities where for the sake of a little temporary gain the laws of health are neglected, to the serious detriment of the people of this nation; (6) the stricter regulation of immigration, preventing importation of defective and diseased persons who will lower the standard of health of the nation; (7) the study of the problems of water supply and disposal of sewage, with special reference to pollution of the water supply by sewage. Such matters as food supply; preservation; transportation and adulteration; quarantine between States; care of life on the highways and waterways; supervision over importation of dangerous articles, such as imperfect hides from South America, filthy rags from the pest-holes of the Old World; studies in personal hygiene; municipal sanitation and health conservation of communities, along lines neglected by cities and States, but of most vital importance; the supply of information to communities by publications, and the care of a thousand minor matters. When we contemplate the possibilities and needs, we wonder that it has not already been accomplished, and it certainly is the duty of every intelligent citizen and the double duty of every member of the medical profession to labor seriously for the establishment of a department of public health whose head shall sit in the Cabinet and advise with the President on matters of the life, health and happiness of our people.

INDEX.

A

Abscess of liver, amebic, 115
    subphrenic, 238
Abulic symptoms in cases of mental disease, 307
Adler, Lewis H., Jr., discussion, 140
    methods in the diagnosis of diseases of the rectum and anus, 135
Alveolar pyorrhea: its cause, sequelæ and cure, 176
Amebic abscess of liver, 115
Anspach, Brooke M.. differential diagnosis and treatment of acute pelvic peritonitis of gonorrheal origin. 299
    discussion, 307
Antiseptic treatment of smallpox, 126
Anus, diagnosis of diseases, 135
Apostoli treatment in some cases of fibroid tumor of uterus, 185
Appendicitis, acute, 32
    complicating typhoid fever, 253
Appendix, surgical relation to typhoid fever, 119
Ashhurst, Astley P. C., discussion, 259

B

Baldwin, Kate W., discussion, 268
Beates, Henry, Jr., discussion, 269
Behrend, Moses, case of typhoid fever complicated by appendicitis, operation, recovery followed by pleurisy with effusion, pulse neothorax; ultimate recovery, 253
    discussion, 260
Berens, Conrad. discussion, 271
Bernd, L. H., Lilliputian delivered of a living child by Cæsarean section, 140
Blood, condition of in pulmonary tuberculosis, 64
Blood-plasma, influence of hunger and hemorrhage on composition of, 279
Borsh. J. L., discussion, 252
Boyd, George M., discussion, 50
Brinkman, Leon. acute appendicitis, 32
    discussion, 45
Brinton, Ward, discussion, 168
Brown-Sequard's paralysis following gunshot wound in neck 204
Burr, Charles W., discussion, 62
    syphilis of the nervous system, 95

C

Cæsarean section in Lilliputian 140
Cairns, Andrew A., discussion, 268, 272
Carncross, Horace L., discussion, 168
Cerebral localization, history of, 191
Cerebrospinal symptoms in infectious diseases, 59
Chandler, Swithin, discussion, 84
Chase, Robert H., significance of abulic symptoms in cases of mental disease, 307
Cholecystitis with calculi, primary typhoid, 109
Christian, H. M., discussion, 108
    treatment of syphilis, 99
Clark, John G., discussion, 305
Coe, discussion, 7
Cohen, Meyer Solis, discussion, 63
Cohen, S. S., discussion, 6, 273
Colgan, J. F. E., discussion, 106
Coplin, W. M. L., discussion, 83, 112
Cornell, Walter S., discussion, 272
Craig, Frank A., diagnosis of advanced pulmonary tuberculosis, 157

D

Daland, Judson, discussion, 279
Davis, G. G., case of resection of elbow, showing results of the operation. 45
    discussion, 30, 43
Deaver, John B., discussion, 13, 30, 41, 58, 114, 125
Dercum, F. X., discussion, 199

E

Eclampsia, treatment of puerperal, 47
Elbow, case of resection of, 45
Eshner, A. A., discussion, 107

Evans, T. Horace, on the advisability of a national department of health and a medical cabinet officer, 314
Exophthalmic goiter associated with paralysis agitans, role of thyroid gland in, 225

F

Faries, Randolph, discussion, 268, 290
typhoid fever in Philadelphia, 287
Fibroma of uterus complicated by disorders of the heart and kidneys, 274
Fibromyxosarcoma of sacrum treated by cataphoric operations, 221
Flick, L. F., discussion, 170
Fracture of scaphoid bone, value of the X-rays in the diagnosis of, 290
Francine, A. P., discussion, 169
Frazier, Charles H., discussion, 202

G

Githens, Thomas Stotesbury, discussion, 285
influence of hunger and hemorrhage on the composition of the blood-plasma, 279
Gonorrheal pelvic peritonitis, acute diagnosis and treatment, 299
Goodwin, A. Helena, discussion, 7
Nauheim and the Schott treatment, 1
Gordon, Alfred, dicsussion, 63, 230
note on Brown-Sequard's paralysis, with report of a case in which the paralysis followed a gunshot wound in the neck, 204
note on cerebrospinal symptoms in infectious diseases, 59
role of thyroid gland in exophthalmic goiter associated with paralysis agitans, 225

H

Hammond, Levi Jay, discussion, 31, 44, 126, 258, 392
skiagraph of ununited fracture of scaphoid bone, 290
surgical relation of the vermiform appendix to perforation in typhoid fever, 119
Hatfield, Charles J., history-taking in cases of pulmonary tuberculosis, 143
Heart, fibrosis of, 188
aneurysm of, 188
disorders of complicating fibroma of uterus, 274
massage of, for chloroform collapse, 73
Hemorrhage during pregnancy, death from, 71
influence of, on composition of blood-plasma, 279
Hernia, a study of 91 cases for the relief of, 16
Hirst, Barton Cooke, discussion, 58
plastic surgery in the University maternity for the year 1903, 55
Holmes, E. W., discussion, 82, 203
Horwitz, Orville, a study of 91 cases for the relief of various forms of hernia, with their complications, 16
discussion, 31
Hughes, William E., syphilis of lung simulating phthisis, 293
Hunger, influence of on composition of blood-plasma, 279

I

Immunity, recent advances in our knowledge of, 128
Infection in the upper abdomen: probably abscess of liver of amebic origin, 115
Infectious diseases, cerebrospinal symptoms in, 59

K

Kassabian, Mihran K., discussion, 252
value of stereoscopic skiagraphy, with practical demonstration, 247
Keen, W. W., discussion, 84, 124
massage of heart for chloroform collapse, 73
Kevin, R. O., discussion, 106
Kidneys, disorders of complicating fibroma of uterus, 274

L

Landis, H. R. M., differential diagnosis between pulmonary tuberculosis and conditions resembling it, 163
Laplace, Ernest, discussion, 106
Leonard, Charles Lester, discussion, 241, 243, 246, 292
Levi, I. Valentine, discussion, 272
Lilliputian delivered of a living child by Cæsarean section, 140
Lip, operative treatment of malignant disease of, 7
Lung syphilis of simulating phthisis, 293

M

McCollin, S. Mason, discussion, 246
    therapeutic uses of X-rays, 242
McFarland, Joseph, discussion, 135
    recent advances in our knowledge of immunity, 128
Malarial fever, use of methylene blue in, 281
Malignant disease, operative treatment of, 7
Mammary gland, operative treatment of malignant disease of, 7
Martin, Collier Ford, discussion, 15, 140
Martin, Edward, discussion, 267, 274, 289, 307, 317
Massage of heart for chloroform collapse, 73
Massey, G. Betton, case of fibromyxosarcoma of the sacrum, successfully treated by cataphoric operations, with preservation of the sphincter, 221
    final results of Apostoli treatment in some cases of fibroid tumor of uterus, 185
Mayo, Charles H., discussion, 82, 113
Medical cabinet officer, advisability of, 314
Mental disease, significance of abulic symptoms in, 307
Methylene blue, use of in malarial fevers, 281
Mewhinney, James C., discussion, 223
Mills, Charles K., cerebral localization, with considerations regarding the subdivisions of areas of representation of cutaneous and muscular sensibility and of concrete concepts, 191
    discussion, 204, 318
Modified milk mixtures, ready methods of formulating, 230
Musser, John H., discussion, 110
    infection in the upper abdomen: probably an abscess of the liver of amebic origin, 115

N

National department of public health, advisability of, 314
Nauheim and the Schott treatment, 1
Newcomet, William S., discussion, 245
Newmayer, S. W., discussion, 274
    relation of the physician to the bureau of health, 260
Noble Charles P. discussion 305
Norris, George William, diagnosis of incipient pulmonary tuberculosis, 147
    discussion, 171
Norris, R. C., discussion, 51, 54, 58

P

Paralysis agitans associated with exophthalmic goiter. role of thyroid gland in, 225
Pearce, F. Savary, discussion, 63
Pelvic peritonitis, 299
Penis, operative treatment of malignant disease of, 7
Peritonitis, diagnosis and treatment of acute pelvic of gonorrheal origin, 299
Pfahler, G. E., case of subphrenic abscess, illustrated by skiagraph, 238
    discussion, 15, 242, 244, 298
Pickett, William, discussion, 201, 286
Plastic surgery in the University Maternity for the year 1903, 55
Pleurisy with effusion complicating typhoid fever, 253
Pneumothorax, complicating typhoid fever, 253
Pregnancy, death from hemorrhage during, 71
Price, Mordecai, discussion, 14, 29, 42, 52, 57, 83, 125
    two cases of death from hemorrhage during pregnancy, 71

R

Randall, B. Alexander, discussion, 53
Rectum, diagnosis of diseases of, 135
    operative treatment of malignant disease of, 7
Relation of the physician to the bureau of health, 260
Roberts, John B., discussion, 245
Rodman, William L., discussion, 15, 241
    operative treatment of malignant disease of the mammary gland, rectum, penis and lip, 7
Roussel, A. E., discussion, 43, 105

S

Schamberg, Jay F., cutaneous manifestations of syphilis, 85
    discussion, 107, 273
Schott treatment, 1
Scott, J. Allison, discussion, 258
Sensibility, subdivisions of areas of representation of cutaneous and muscular, 191

Shelmerdine, E. Kirkland, ready methods of formulating modified milk mixtures, 230
Shoemaker, George Erety, discussion, 279
  fibroma of the uterus complicated by disorders of the heart and kidneys, 274
Siter, E. Hollingsworth, discussion, 105
Skiagraph of ununited fracture of scaphoid bone, 290
Skiagraphy, value of stereoscopic, 247
Smallpox, antiseptic treatment of, 126
Smith, D. D., alveolar pyorrhea: its cause, sequelæ and cure, 176
Spangler, R. H., discussion, 272
Special lectures for the County Medical Society, 171
Spiller, W. G., discussion, 200
Stewart, Francis T., case of primary typhoid cholecystitis with calculi, 109
Subphrenic abscess, illustrated by skiagraph, 238
Swan, John M., condition of blood in pulmonary tuberculosis, 64
  visceral syphilis, 88
Symposium on syphilis, 85
  on tuberculosis, 143
Syphilis, cutaneous manifestations of 85
  of lung, simulating phthisis, 293
  of nervous system, 95
  symposium on, 85
  treatment of, 90
  visceral, 88

T

Taylor, J. Madison, discussion, 84, 268
  special lectures for the County Medical Society, 171
Teller, W. H., discussion, 258
Thyroid gland in exophthalmic goiter associated with paralysis agitans, role of, 225
Tuberculosis, condition of blood in pulmonary, 64
  history-taking in pulmonary, 143
  diagnosis of advanced pulmonary, 157
  diagnosis of incipient, 147
Tuberculosis, differential diagnosis between pulmonary, and conditions resembling it, 163
  physical signs and sputum of incipient pulmonary, 209
  symposium on, 143
Typhoid cholecystitis with calculi, primary, 109
Typhoid fever complicated by appendicitis, pleurisy with effusion, pneumothorax, 253
  in Philadelphia, 287
  surgical relation of vermiform appendix to, 119
Tyson, James, discussion, 54
  treatment of puerperal eclampsia, 47

U

Uterus, Apostoli treatment of fibroid tumor of, 185
  fibroma of, complicated by disorders of the heart and kidneys, 274

W

Wadsworth, William S., discussion, 318
  fibrosis of heart: aneurysm of heart, 188
Wetherill, H E., discussion, 285
Willard, DeForest, infection in the upper abdomen: probably an abscess of the liver of amebic origin, 115
Willson, Robert N., discussion, 44, 50 53, 104, 170, 298
  physical signs and sputum of incipient pulmonary tuberculosis, 209
  syphilis of the lung, simulating phthisis, 293
Wilson, Samuel M., antiseptic treatment of smallpox, 126
Wood, H. C., Jr., discussion, 83, 286
  use of methylene blue in malarial fevers, 281

X

X-rays, in diagnosis of fractures at wrist, 290
  therapeutic uses of, 242